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THE EXCAVATING ENGINEER PUBLISHING COMPANY

BRADLEE VAN BRUNT, Manager and Editor

267 NATIONAL AVENUE MILWAUKEE, WIS., U. S. A.

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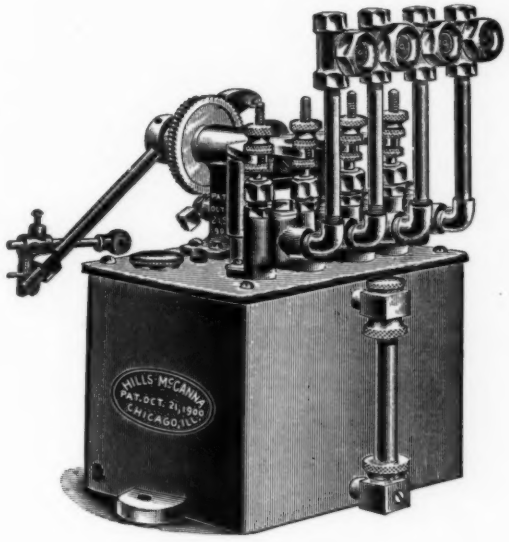

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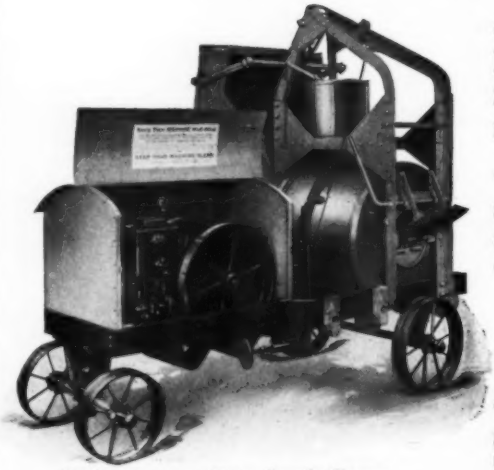

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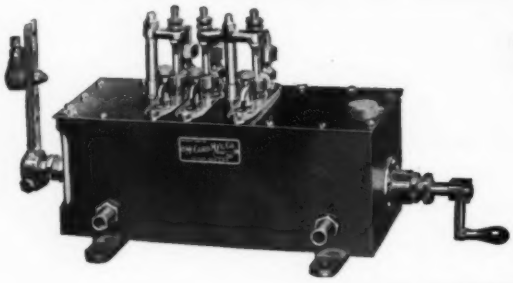

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Ladder dredge "Corozal" dredging light material

Bucyrus dipper dredge "Gamboa" loading a new 1000-yard steel scow

Drill boat "Teredo" blown up recently by a premature blast

The "Paraiso" has been m... point to allow for a...

5-Yard dipper dredge "Mindi"

Fig...

CURCARACHA SLIDE

" blown up
ture blast

The "Paraiso" has been moved from this point to allow for a blast

20-inch hydraulic dredge cleaning up bottom after dipper dredges

Bucyrus dipper dredge "Paraiso" moved ba
a blast. This dredge and the "Gamboa" ar
largest and most powerful dipper dredges ever

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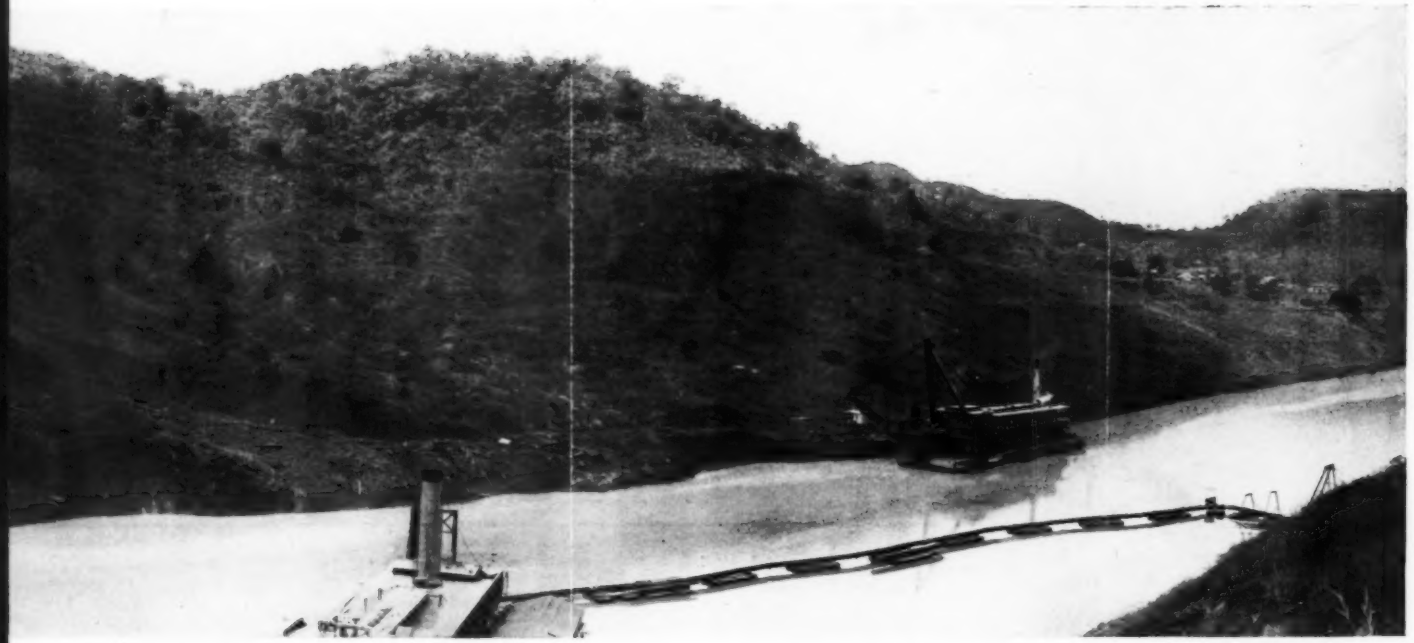
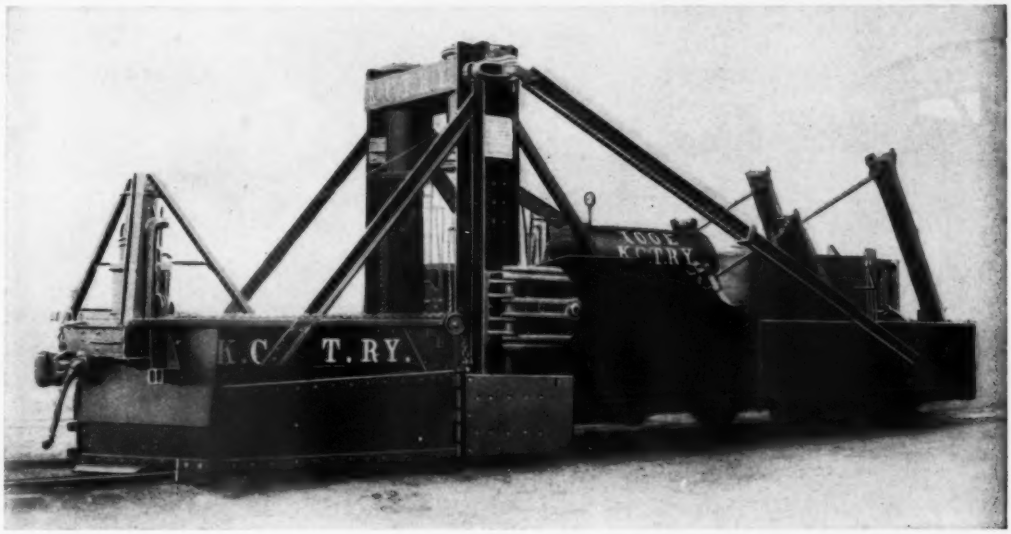


20-inch hydraulic dredge cleaning up bottom after dipper dredges

Bucyrus dipper dredge "Paraiso" moved back for a blast. This dredge and the "Gamboa" are the largest and most powerful dipper dredges ever built

Cut

As long as the supply lasts, a copy of this panorama will, upon request, be mailed in a tube to every new subscriber and to every person renewing his subscription to The Excavating Engineer.



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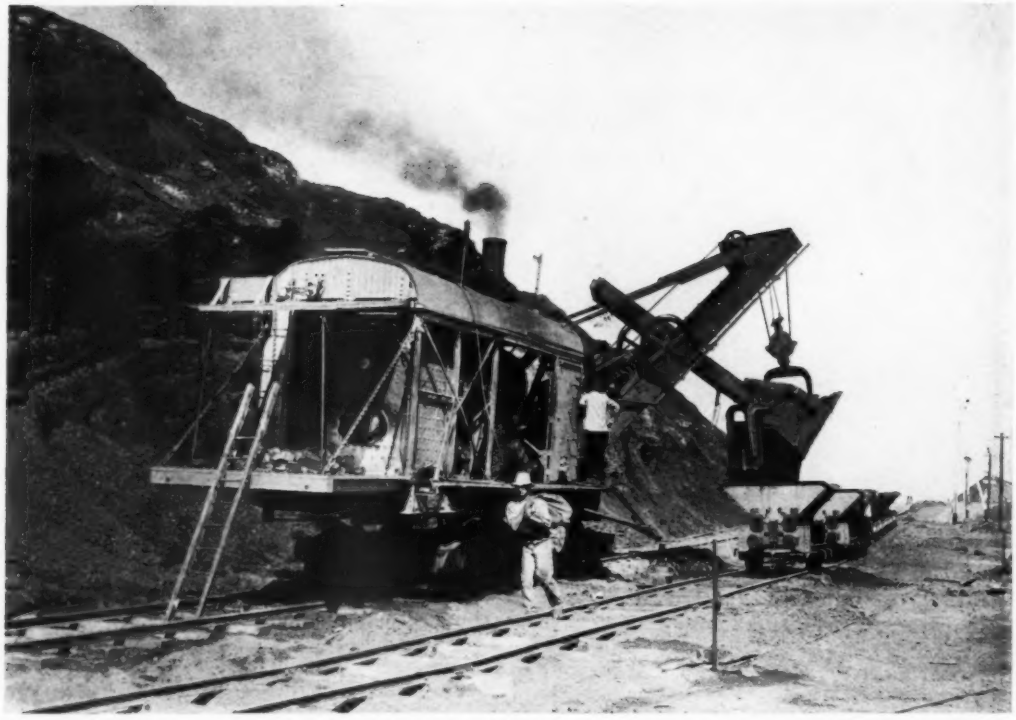
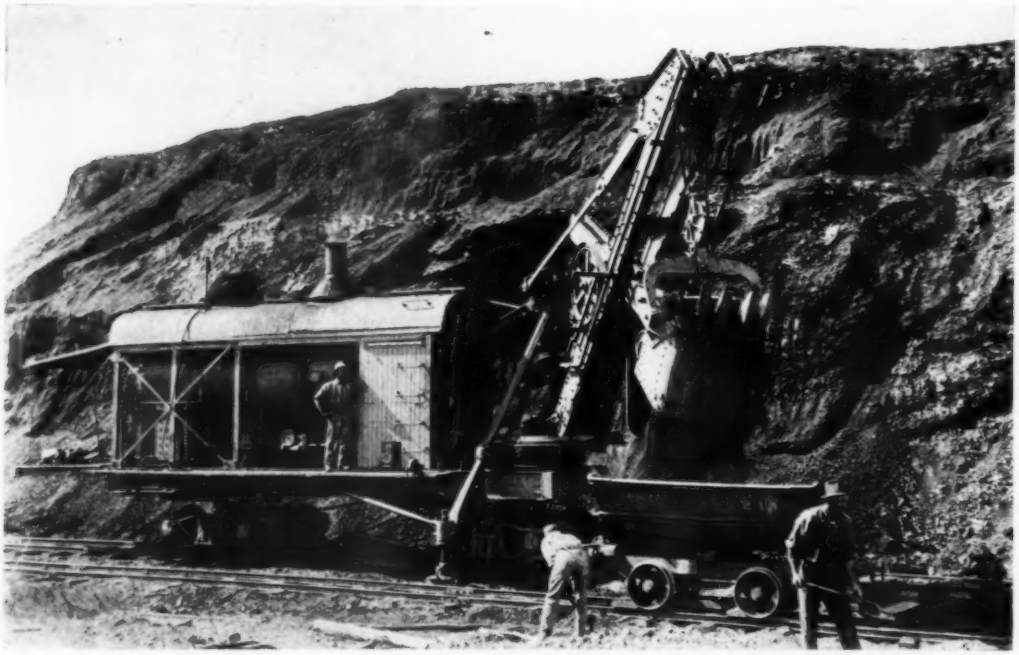




40-R Bucyrus Steam Shovel Loading Copper Ore in the Mines of The Wallaroo and Moonta Mining and Smelting Company, South Australia

The Excavating Engineer

Vol. 11 DECEMBER, 1914 No. 3

The Wallaroo and Moonta Mines, Australia

Description of the largest mines in South Australia. A 40-R Bucyrus steam shovel used for excavating low-grade copper ore from an old dump.

ALTHOUGH the use of a steam shovel is merely incidental to the main operations, a description of these, South Australia's largest mines, should be of interest to our readers.

The Wallaroo and Moonta mines were originally organized as separate companies, but were amalgamated into the Wallaroo and Moonta Mining and Smelting Company, Limited, in the year 1889.

In the 54 years of their existance, up to December 31st 1913, these mines have provided about £15,780,000 worth of copper, and paid £2,230,000 as dividends.

To the above mentioned date 10,200,000 tons of crude ore and material from exploratory work has been taken out. At the present time the Wallaroo mines produce yearly, 130,000 tons of crude veinstuff, exclusive of re-treatments, the copper contents of which is 4% while the Moonta mines produce 29,000 tons with 3.8% copper.

Although situated only 10 miles apart there are marked contrasts in the two mines, the Wallaroo rock being softer but tougher than that found at Moonta. The total length of the shafts, drives and other underground workings is about 85 miles.

The Wallaroo Mines

The bulk of the operations of the Wallaroo mines lies between 1700 and 2430 feet from the surface. A larger yearly output of copper is being obtained from this section of the mine than was previously won, even from greater areas and under easier conditions. This is due to the installation of more powerful machinery, and to vigorous exploration and modern methods of ore-raising. The increasing difficulty arising from greater depths and the necessity for artificial ventilation has been more than compensated for in this way.

The mining operations are carried on from two principal shafts, known as Taylor's and Young's.

The nature of the ground is such as to require heavy timbering and close filling. The stoping is "overhand," and the excavations have to be frequently cleared of broken veinstuff and filled with crushed waste rock locally known as "attle." The "stulls" are of various types according to the width of the lode. In narrow workings legs and caps are used, but in the wider excavations solid styes of timber are built to support the caps. In many of the stopes great care has to be taken to prevent sudden falls of ground. The roof and sides become detached through exposure to the air, and the country rock is of a class that forms what is called swelling ground. Tremendous strains are thus imposed on the supports carrying the lode material as it is fractured and loosened by the crushing of the rock from the sides. These supports or styes are built of timbers laid on each other in alternate pairs to form hollow rectangles, which are filled with attle and carried up to the roof, forming solid pillars capable of bearing enormous weight.

A stope is worked by taking off a few feet in thickness overhead at one end, and immediately building a stye from the filling underfoot to sustain the new roof, while continuing the work towards the opposite end of the stope. These styes are gradually buried in the filling, but their service though only temporary, is very effective. Up to date no system has been found to compare with this for dealing with heavy treacherous ground.

The Cornish pumping machinery in Taylor's shaft was rendered useless by fire in 1904, and a system of electric pumping was introduced. There are three pump chambers at different levels fitted with Worthington vertical three-throw plunger pumps, driven by A-C motors. An old Cornish pump in one of the shafts is still in commission. In addition to these there is also a complete installation of Worthington duplex pumps operated by compressed air.

At Taylor's shaft the veinstuff, as brought to the surface is passed over a grizzly into large overhead bins, the fines and rough from which are carried separately by the surface railway and tipped into sunk bins at the ore sorting plant.

At Young's shaft the large rocks only are removed by the grizzly, while the bulk of the ore is carried by a belt conveyor 500 feet to the sorting plant, where it passes over another grizzly into fine and rough overhead bins. The rocks are carried by the surface railway and tipped into a sunk bin.

From the bins the veinstuff gravitates to a preliminary sorting belt, working many feet below surface level, from which the better class of ore is selected by hand and transferred to a second conveyor belt which carries it to what is known as the "best ore" section of the mill. The remainder, passes over the end of the belt into a No. 6 Gates' breaker after which it is sorted into three sizes, the two smaller sizes go eventually to the concentrating plant. The over-size veinstuff falls into a conveyor belt on either side of which sit boys and aged men, who pick off the ore, the "attle," and certain special grades of material, dropping them into bins below the belt, which are sufficiently high from the ground to discharge into trucks on the surface railway. The remainder consisting chiefly of "dredge," carrying about 2½% of copper, passes over the end of the conveyor into a bin, and is thence railed direct to the concentrating plant. The better grade of ore, mentioned above is similarly treated in a smaller section of the plant, the finer and higher grade ore going direct to the smelters.

The material for wet crushing and concentrating on reaching the mill is elevated from bins to a Hancock jig, a machine invented by H. R. Hancock, and used extensively, not only in Australia, but in America. The jig concentrates are elevated to storage bins and from thence to the smelter, from whence the middlings and tailings emerge as a fine sand and are dealt with by flotation. The concentrates from this process are elevated to vats where the coarser are drained on filter bottoms and the finer dried on floors. The residue sands are dumped by an incline belt conveyor and the slimes deposited in a dam. The "attle" from the sorting belt is crushed and utilized to fill depleted stopes. At the present time old accumulations of material from the waste dumps are being retreated at the concentrating plant by recrushing and flotation, about 1500 tons per week being dealt with in this way. These materials are of various kinds, including jig tailings, sands and slimes from the old concentrating machinery, and also untreated veinstuff of low grade, this last being passed through the primary rolls and over the jig before going to the recrushing and flotation machinery.

Steam Shovel Work

The excavation at the dumps is being done mainly by a 40-R Bucyrus steam shovel, which loads the stuff into trucks on the railway. This shovel is equipped with 1½ yard dipper, and weighs about 48 tons in working order. It was started

40-R Bucyrus in Action

at work early in April 1913 and was used exclusively on the dumps. The dump it is now excavating is about 30 feet in height, of which 20 feet is of large stones compacted into a fairly solid mass, with 10 feet of loose tailings from former concentrating operations on top. In order to do the excavating in one stage, and check any tendency to form an overhanging cornice, which might be somewhat dangerous, the upper part of the more solid material is loosened by blasting here and there with powder. With this assistance the whole body of material from the ground upwards is handled without the slightest trouble. According to H. Lipson Hancock, general manager, the shovel has given entire satisfaction.

The Moonta Mines

Stoping operations at Moonta mines to-day are carried on by the overhand method though the underhand system was practicable in the earlier history of the mine, as the sides were then more self-supporting.

Both at Wallaroo and Moonta mines the veinstuff goes direct from the stop-passes through shoots into wagons at the various levels, and from these it is tipped into bins at the shaft plats, whence it is filled into skips through outlets with iron doors worked by levers.

The main shafts at both mines are equipped as far as practicable with a system of bin winzes, which afford storage for the ore and admit of stuff trammed at the different producing levels being transferred to one level for hauling to surface.

Owing to the amount of the dip, and to the hard nature of the rock, cross-cutting at Moonta is expensive, and the shafts are mostly sunk on the lode, wheel skips being used for hoisting.

The ore raised at the different subsidiary shafts is discharged into bins, from which it is trucked by railway to the sorting plant situated at Taylor's shaft. The process is very similar to that described.

Concentration Process

The accumulation of old jig tailings are leached in five heaps, covering an area of about 20 acres, and containing about 1,500,000 tons originally estimated at 0.9% copper in addition to the slime deposits amounting to about 323,000 tons. The old slimes from the concentrating process, not being amenable to treatment by percolation, are exposed in shallow heaps for oxidation, the process of corrosion being greatly accelerated by a system of ploughing. An area of about 60 acres is occupied by material undergoing treatment. As soon as the surface portion is sufficiently oxidized it is removed by wheeled scoops to tipping platforms, by which it is loaded into trucks and taken to a treatment plant situated on the side of the largest tailings heap.

The total quantity of precipitate recovered up to the end of 1912 was about 9400 tons, of an average value of about 76%. An annual quantity of about 700 tons pure copper is being obtained from this source.

Smelting Works

The mines have very complete smelting works, consisting of a de-sulphurization plant, sulphuric acid works, two blast furnaces, a modern converter plant and a refinery.

Wallaroo copper is well known for its high quality; it is used for coinage purposes in the Calcutta and Bombay Mints, and commands a ready sale in Europe, India and China.

We are indebted to Mr. Lipson Hancock, general manager of the mines and to the Mining and Engineering Review of Melbourne, for the information contained herein.

Excavation for the Newark Trolley Terminal Completed.

Excavation work on the new trolley terminal of the Public Service Newark Railway Company was finished on October 10th. As described in our August number, the lifting of the first dipperfull of earth was celebrated with impressive ceremony on the morning of June the 24th. The total excavation amounted to about 150,000 cubic yards. The shovel used was an 18-B Bucyrus with a $\frac{5}{8}$ yard dipper. The material handled was sand and gravel with a clay surface. The excavation was 25 feet deep taken in cuts varying from 50 to 200 feet in length and from 20 to 30 feet in width. The shovel loaded Pierce Arrow trucks having an average capacity of 5 cubic yards per load. Thirteen trucks were used. The average haul was about four miles. The material was used for filling low land. From 130 to 145 loads were taken from the shovel per day of nine hours. The largest number for one day being 156 or about 780 cubic yards in a nine hour working day.

The shovel burned from three quarters to one ton of soft coal a day. Water was piped to the shovel.

For six weeks the shovel was double-crewed. An engineer at $175 per month, a fireman at $80 and three pitmen at $2 per day a piece, formed the crew. The shovel was operated by S. C. Oberle with F. Merishems as his fireman.

The Holbrook, Cabot & Rollins Corporation, were the contractors.

18-B Bucyrus Revolving Shovel, Excavating for the Newark Trolley Terminal. Holbrook, Cabot and Rollins Corp., Contractors

An old Irish woman, who kept a small fruit stand in Dublin, was displaying for sale a few watermelons, which had been given her. A smart Yankee wishing to take a rise out of her, took up one of the lot, observing: "These are tarnation small apples you grow over here—now in America we have them twice this size."

The woman slowly removed the dhudeen she was smoking from between her lips, and coolly surveyed her inquirer from head to foot for a second or two. Then, in a tone of pity, she exclaimed:

"Be jabers, sorr, ye must be sthranger in Oireland, and know virry little about the fruit av our counthry when ye can't tell apples from gooseberries."

Figure 1—End of the Discharge Pipe

Figure 2—Section of Pontoon

Figure 3—Dredge Under Construction Showing Screens

Figure 4—Dredge and Discharge Line

The Calumet & Hecla Company's Bucyrus Hydraulic Dredge

Reclaiming the Calumet & Hecla Tailings with a Hydraulic Dredge

How the Calumet & Hecla Company have solved a troublesome problem—Description of a hydraulic dredge which digs 100 feet below the surface of the water.

FOR nearly forty years, the Calumet & Helca Copper Mining Company have deposited in Torch Lake at Lake Linden, Houghton County, Michigan an immense amount of tailings—the residue from the rock crushed in the stamp mills. Until a comparatively recent date these tailings were supposed to be worthless, although it was known that a large amount of copper was contained therein, more indeed than was extracted from the original ore. A process has recently been perfected, however, whereby these tailings can be re-worked and the copper recovered.

Figure 5—Dredge in Operation

It is estimated that the amount to be recovered on the shores and in the lake aggregate 40,000,000 tons.

In order to accomplish this, the Calumet & Hecla Company have under construction a hydraulic dredge, which is designed to dig to a depth of 100 feet below the surface of the lake, a greater depth than has ever been attempted by a hydraulic dredge before. In fact, the maximum depth dredged in this manner at the present time is attained by the sand suckers in Long Island Sound, a depth of 70 feet.

The dredge was designed and built by the Bucyrus Company.

The problem encountered as far as it affects the dredge design is somewhat complex. Certain portions of the tailings piles have in the past been used as a public dump, consequently, a certain percentage of foreign matter is contained therein. It becomes necessary, therefore, to screen the material thoroughly before delivery. As, however, only a portion of it requires screening, the design of the dredge must be such that the screen may be cut out when not required. This has led to the necessity of two pumps, and a complicated control.

Design of Dredge

The dredge has a steel hull, 110 feet long, 56 feet wide and 9 feet deep. The deck, however, has an 8 foot overhang, which makes the extreme width of the hull 72 feet. The digging ladder is 136 feet in length, requiring a ladder well 70 feet long by 10 feet wide. This extreme length of well has necessitated an exceedingly heavy overhead truss.

There are two centrifugal dredging pumps, each of 20 inch diameter, which for convenience will hereafter be referred to as No. 1 and No. 2. Two pumps instead of the usual one are made necessary by the screening problem mentioned before. No. 1 pump is driven by a 750 H. P. motor and No. 2 by one of 1250 H. P.

Pump No. 1 delivers the material directly from the lake to the screen on the dredge. When this screen is disconnected, by changing the pipe connections, it pumps ashore through a pipe line up to 800 feet in length, with a maximum elevation of about 30 feet.

Pump No. 2 pumps ashore from the sump under the screen through a pipe up to 2500 to 3000 feet in length, with a maximum elevation of about 10 feet. This pump is so designed that it may be connected to the suction pipe and thus take the material directly from the bottom of the lake to shore, in place of No. 1. Either pump may be used independently when the screen is not in use. The decision as to which pump should be used depends upon the length of the pipe line at the time. It is impossible, of course, to make one pump suffice as the screen, when in use, breaks the flow.

The screen is 7 feet in diameter and about 45 feet long. It is made of managnese plates with

perforations one inch in diameter. It delivers the refuse to a scow alongside.

No cutterhead is required because of the loose character of the material, which has no binder. Hydraulic jets are provided, however, with which to break up the material if necessary. These jets are operated by an 8-inch, two-stage horizontal double suction turbine pump, driven by an independent motor.

On account of the great depth of the lake and the soft nature of the material, the dredge works on head and side lines instead of spuds.

Instead of one winch, as is the custom on dredges of this type, the length of the ladder well makes it necessary to have two. Each has four drums, for the ladder hoist, two bow swing lines, two ladder swing lines, two stern swing lines, and a tail line. Each winch is driven by an independent 50 H. P. motor.

An air compressor is provided for operating the air cylinders which control the friction clutches. A 6 inch service pump of the same type as the jet pump is supplied for sealing the swivel joints in the suction pipe in order to prevent air leaks. There is also an overhead crane for serving the machinery.

As the dredge is designed to work the year around, a 75 H. P. boiler is provided for heating purposes and for driving the capstans and electric light plant when the dredge is being shifted and no electric power is available.

The two-pump feature has necessitated a number of unusual features of control. The pumps, in the first place must be balanced, so that No. 1 will not deliver more material then No. 2 can take care of. This is possible as No. 1 is working under a constant load, while the load No. 2 carries varies according to the length of the discharge pipe which is in use. This necessitates a careful adjusting of the speeds of the pumps. After thorough study a water rheostat was adopted, the first time that this has ever been tried in the United States for large motors. This device gives an infinite number of speed control points and thus great flexibility. The speed is governed by the height of the liquid in the rheostat tanks, and the flow by a pivoted over-flow pipe, which is full on when in a vertical position and off when horizontal. The operator controls the position of the pipe. The liquid must be kept in circulation because of the danger of heating. It is pumped through cooling coils and returned to a storage tank overhead, from which it flows by gravity into the rheostat tanks. The flow is controlled by a valve with an automatic solonoid control. A 3-inch centrifugal pump driven by an independent motor does the pumping.

Another interesting feature is the interlocking electrical control, in order to prevent starting and stopping the pumps in the wrong order.

The electrical power used is 2100-volts A-C, 25-cycle, 3-phase.

Discharge Line

The discharge line and the means used to support it are interesting. The great amount of material to be dredged made it desirable to use unusually durable pipe. The line consists approximately of

The Dredge and Ladder, Showing Suction Pipe

500 feet of floating pipe and 1250 feet of shore line, all 20 inch internal diameter. Lap-welded steel pipe is used. The majority of it is ½ inch thick, but a few lengths of ¾ inch pipe were inserted for experimental purposes. Most of the floating pipes have oval bands welded on the ends for joining by rubber sleeves, but two flexible joints have been used for comparison with the sleeves. One of these is a Parker joint and the other is a special design of manganese steel with a manganese liner. The floating line is made up of 20 foot lengths, and the shore line of 30 foot lengths. The latter has rolled steel flanges shrunk on the ends for joining pipes together. When the pipe wears out these flanges will be cut off, bored out and shrunk on new pipe, permitting the renewal of the line with plain end pipe and the indefinite use of the old flanges.

Pontoons

Twenty-six pontoons carry the floating discharge line. Each pontoon consists of two steel cylinders, 48 inch internal diameter and 17 feet 2 inches long, with the necessary structural work. The sides of these cylinders are ¼ inch thick, heads 5-16 inch

and are forge-welded throughout. Rivets were employed only to secure the structural work and cross-bracing between the cylinders, and these rivets were all placed above the water line. An accompanying illustration shows one of these pontoons being erected, and brings out well, the structural towers which carry the high tension wires for operating the dredge. Each tower is provided with a ladder to permit easy access. It is hoped that the use of welded pontoons and an absence of rivets below the water line will result in a longer life for the pontoons, due to the smooth surface and consequent freedom from erosion.

The severity of the winters in the Michigan copper country lead to another feature in this installation. It was important that enough material be stored in a small area close to the regrinding plant to insure operation of the latter through the winter. It is possible to keep the ice broken over only a small area. To accomplish this a portion of the discharge from the 20 inch line from the dredge is carried to the selected area throughout the summer, through a Y valve and a separate line. In the winter the regrinding plant can get a supply from this storage bank. A structural bridge, swinging over the entire bank, carries the suction line which connects to a centrifugal pump in the regrinding plant. This suction line is made up of 12-inch lap-welded pipe, ½ inch thick, with forge-welded flanges. A special suction head is provided with a manganese cutting blade, swivel joints, flap valves, etc., all made with manganese wearing parts. The pipe line and pontoons were furnished by the M. W. Kellogg Co., 50 Church St., New York City.

The dredge will not be operated to full capacity, probably until next spring.

Grading McGill University's New Athletic Field

Revolving Shovel Operation in Shale, Hardpan and Rock.

The McGill University of Montreal have started work upon an extensive athletic equipment, consisting of a reinforced concrete stadium with athletic field and running track, an out-door skating rink, a gymnasium and other accessory buildings, amounting in all to two million dollars.

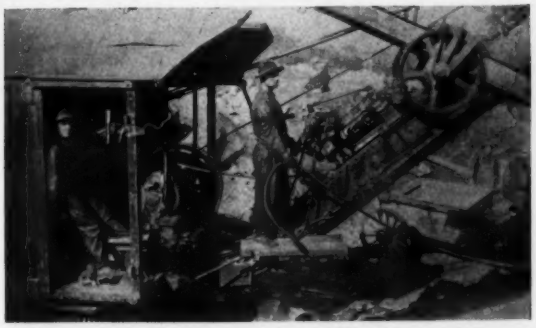
The contract has been awarded to L. A. Ott & Company of Montreal. The excavation, as is shown by the accompanying views amounts to about 50,000 cubic yards of shovel work and a considerable quantity of rock which is being handled by hand as described later.

General View of Operations

An 18-B Bucyrus shovel with a ⅞ cubic yard dipper is being used. Work was started August first and the contract calls for completion by September 1915. Such good progress is being made, however, that Mr. Ott expects to anticipate this date considerably.

18-B Bucyrus Loading Hardpan into Western Dump Wagons

The excavation consists of 12 to 14 feet of loose rock and earth, below which is solid limestone. Mr. Ott reports that the shovel is acquitting itself well, so well indeed, that it paid for itself during the first month of operation.



18-B in Action, Showing Cranesman's Platform as Used on this Job. O. Norman, Engineer, L. Lachapelle, Cranesman

The haul, at the present time, is short, consequently eight to ten teams are sufficient to keep the shovel busy. It is averaging between 450 and 500 cubic yards a day.

In addition to the shovel there are six Western 1½ cubic yard dump cars. These are being loaded with rock by hand. This rock is taken to a crushing plant, where it is crushed and stored for use in the construction of the reinforced concrete grandstand, which is to be 400 feet long with a seating capacity of 12,000; the first of its kind to be erected in Canada. This is also the first time that a revolving shovel has entered the field of athletics!

D. S. Beaudry is superintendent for L. A. Ott & Company on this job. O. Norman is operating the shovel, L. Lachapelle craning and T. Stanley firing.

On the Job
From left to right—L. A. Ott and W. Duquette of L. A. Ott & Co.; Ed. King, Bucyrus Co.; D. S. Beandry, Supt. L. A. Ott & Co.; Burton St. John, Canadian Equipment Co., Ltd.

G. A. Heman's 14-B Bucyrus Revolving Shovel, Ripping up 20 foot by 600 foot Concrete Blocks in Ogden, Utah

Ripping Up Concrete Foundation with a Revolving Shovel

Six hundred foot concrete blocks, 20 feet wide torn up at the rate of one a day.

UNTIL G. A. Heman showed the way, old pavements in the city of Ogden, Utah, had been torn up by the time-worn method of rooters and scarifiers. Mr. Heman has just completed a contract for paving eight blocks in Ogden with asphalt. This work included the ripping up of 1400 square yards of old pavement with a concrete base which was from ten to twelve inches in thickness.

The concrete blocks were 600 feet in length and measured 20 feet in width from the curb to the cobblestones which bound the pavement to the street car tracks. The shovel had no difficulty in tearing up a block a day. Progress was impeded considerably by the fact that the wagons had to stand in the street car tracks while being loaded. It was rare that they did not have to drive away from one to three times to allow a car to pass.

Ripping up the Concrete Blocks

The job was started with plows and scarifiers. For several days they were used with both teams and engines as power, with the result of but scratching a few holes in the concrete.

Mr. Heman happened to have a new 14-B Bucyrus shovel which was just finishing the basement of the Dee-Eccless Building. This machine was moved on the job, and the views we reproduce show better than words how it got its nose into it.

The Labor cost per day for this job follows:

One steam shovel engineer	$ 7.00
One steam shovel fireman	3.00
Two pitmen, at $2.00	4.00
Five teams and wagons at $5.00	25.00
One foreman	4.50
Total	$43.50

This cost of ripping up approximately 1400 square yards of base was done at about one tenth the estimated cost.

How a Foreman Can Save His Employer Money

By Robt. B. Shapinsky

Jim Brown was an ambitious young foreman who wanted to increase his own salary by adding to the profits of the contractor who employed him. Brown had done some reading, considerable watching of his own jobs and others and a great deal of thinking, resulting in a growing belief that efficiency—the Word of the twentieth century—was something more than the subject of Saturday Evening Post articles or the catch-word of advertising spell-binders. Brown's sorrow was that he could not convince his employer. He determined that if reasoning could not prove his case, he was going to show him the results in a way that would be final proof.

The contractor had a job of dirt excavation to which Brown was transferred shortly after it had been opened. Jim found certain "inefficiencies" taking place and he determined that he was going to make more money for the "boss" or die in the attempt. "Get the teams moving" became his slogan. He reasoned that they were the most expensive part of his job and that he must get the utmost good out of them. For example, about once in every half-hour a wagon would return while another was still being loaded. Instead of dividing his gang, as his predecessor had done—resulting in more "piling-up," because the shorter gang took more time with the first wagon—he added another man in order to reduce the loading time per wagon.

Not a move that would aid in loading out his teams more rapidly was overlooked. No left-handed man, with the characteristic brainlessness of the average laborer, was permitted to stand at the left side of the wagon when loading. Brown knew that this would necessitate the man's moving and turning around completely with each shovelful of dirt. He was determined that not a stroke of labor should be wasted on his job. As a result of such planning Brown reduced the loading time from ten to six minutes, in addition to time gained in other ways, such as the elimination of all delay. In a short time, each of five teams was making two more trips each day. At a price of fifty cents per yard, this meant an increase of $5 a day—a clear profit—and at the end of four weeks, Brown proved to his employer that he had made $100 more on the job than he would have gained by working without "efficiency."

This is one example of what efficient foremanship can do on what is probably the most typical of construction jobs—dirt excavation.

Perhaps the methods that Brown used in getting the extra margin on his job were only those that every construction man knows to be the best. But Brown actually carried them out while others, whose experience has given them knowledge, do not take the trouble to apply it to their own advantage. For example, every one knows that when men take extra steps with each shovelful of dirt or material, the profits are being eaten up. Yet, on the construction of a large traction line, a foreman calmly rolled cigarettes in silence while a line of laborers walked ten feet to a pile with each shovel of dirt. It was obvious that a few wheelbarrows would have made a difference that would figure in the costs. In many cases, the contractor knows that certain operations are being carried on wastefully but does not take the trouble to devise better plans of working, thinking that he will arrange things better on his next job."

An example of what a little thought will do in the arrangement of work was shown in the grading of a basement floor in a large warehouse, from which trash was being removed at the same time. The foreman placed two separate gangs on this work. For "geographical" reasons the trash was being rolled to a point near the cinder pile. One gang pushed empty buggies into the basement, and carried out the trash while the other rolled "empties" in the opposite direction over the same run in order to load with cinders. The contractor on visiting the job, took in the situation and by combining the two jobs, cut one of the gangs off the pay-roll. Men who are looking for such economies as these are bound to find them. Undoubtedly it is the man who can find them who figures lowest and who carries on his business most successfully.

If the small operations on a job are carried on carelessly, it is almost a certainty that the big ones will be "eating up" the contractor. An engineer watching the excavation for a large office-building, saw first that the rock men were permitted to sledge the rock to pebbles, instead of making building stone or even good rip-rap of the material. As a result they were taking about four times as long in their hammering as would have been necessary. Turning to the teams, he saw that foremen were ordering wagons out when only three-quarters loaded. He was not surprised at the carelessness of the laborers and sub-foremen when he observed that the engine operating the air-compressor—for the drills—was harnessed to a boiler of much greater horse-power so that much of the power of the latter was wasted. This was due to the inexperience of the officers of the construction company.

Efficiency is not some vague, indefinite thing, remote from the average man, as many construction men imagine, but it is a concrete dollars-and-cents matter, that can be worked out on any job. With the battle for contracts, especially on larger jobs, it must be worked out if the contractor expects to stay in the game. The case of Jim Brown is typical of what it will do on the small jobs. It is a matter of common sense and of watching the details to see that no bit of work is wasted and that everything accomplishes the utmost good.

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Bradlee Van Brunt, Manager and Editor
227 National Avenue Milwaukee, Wis., U. S. A.

Construction Outlook

The last three weeks have developed a striking change in business sentiment. The state of uncertainty which has so depressed the country is gradually giving way to a wave of optimism, which is most encouraging.

All who are in touch with conditions are unanimous in their opinion that the turning point has been reached. The opening of the Federal Reserve Banks has resulted in far better financial conditions; money is easier, the lending power of the banks has been greatly increased, stocks are better than they have been since July and foreign exchange is normal.

Steel has perhaps suffered more than any other branch of industry, but even this is feeling the general improvement. The Gary mills have been re-opened, and other large mills have added greatly to their output. Judge Gary himself is most optimistic as to the future.

The influx of orders for war materials has made a very noticable improvement upon conditions. In addition to this, the cotton crop is improving and there is an excellent prospect for a big wheat crop. Furthermore, there has developed an enormous foreign demand for grain.

Another favorable development which has influenced the general trend of opinion is the result of the November elections. It is safe to say that this brightening on the business horizon will be made a permanent and definite condition if the rate commission will see fit to decide in favor of the railroads. It would assure a return to the former good times when the construction season opens in the Spring.

Naturally the winter season has caused a slowing up in the construction activities, but even taking this into consideration, we observe improvement along certain lines. The Rivers and Harbors bill is beginning to produce results. State, county and municipal fields are active. Highway work has slowed up somewhat, but we have noticed a distinct increase in the crop of electric railroad projects,, which may be noted by glancing over the items under "Prospective Construction". One or two big contracts have been awarded, chief among these, the contract for the Twin Peaks Tunnel to Robert C. Storrie & Co., of San Francisco, for $3,372,000.00, a project which has been pending for some time.

Drainage work looks good, and we will soon hear of the awarding of one of the largest pieces of work that has been placed for some time. We refer to the Crittenden Drainage District No. 3 in Arkansas, which will offer 5,164,000 cubic yards of dredge work.

It would not be out of place to remark in closing that this is the psychological time to boost.

Eighth Annual Convention, American Road Builders' Association

The Eighth Annual Convention of the American Road Builders' Association will be held in the International Amphi Theatre, Chicago on the 14th, 15th, 16th, 17th and 18th of December.

It is expected that there will be an unusually good exhibitions of road machinery and materials. The Bucyrus Company expect to have a revolving shovel in operation, and several other manufacturers are making similar arrangements. The Government and various of the states will make exhibitions of materials and methods of construction.

Fast Shovel Operation on Road Work in New York.

The Ruddy & Saunders Construction Company, of Troy, N. Y., have a 14-B Bucyrus shovel and two Thews, all equipped with ⅝ cubic yard dippers operating on their contract between Fisk's Eddy and Codosia, N. Y. The Bucyrus has recently been digging good material in a 25-foot bank with a 300 to 400 foot haul, and has been loading from four to five hundred two-yard wagons per day. T. J. DeLee, superintendent for the contractors, advises that the machine loaded 67 two-yard wagons in two hours time, and has excavated 52 buckets full in 16 minutes. He makes the statement that whenever hard digging was encountered, the Bucyrus was put on the job. This machine has been used on all the rock work encountered.

A 60-C Bucyrus digging a tail race for the Ebro Irrigation & Po other Bucyrus shovels of this type, one for excavating the channel between two storage reservoirs on the line of the and irrigation developments for Barcelona, Spain.

How small hand cars can be loaded with a big shovel—A 70C Bucyrus electric in operation in the quarries of the Granite Quarries Limited, Burrards Inlet, British Columbia.

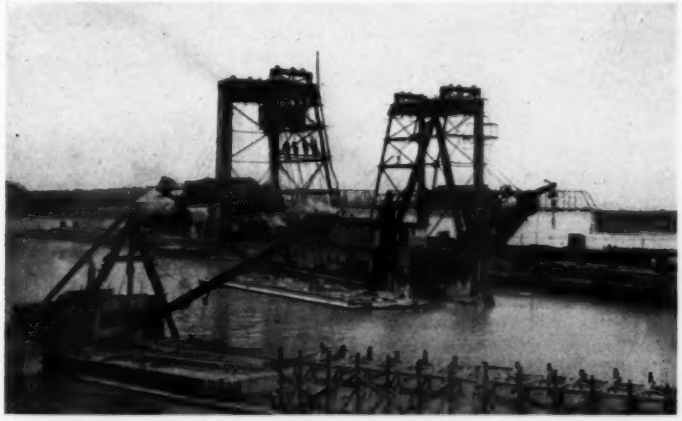
Grant, Smith & Co. and Locher's class 14 Bucyrus dragline excavator whipping out yardage on the New York State Barge Canal near Utica, New York.

G. A. Heman's 14-B Bucyrus shovel digs Building in Ogden, Utah. The excavation progress was made because of the extra and water pipes, etc., encountered. It work, and took out 2500 cubic yards of

ion & Power Co., Ltd., at Lerida, Spain. This company used two ting the railway for an earthfill dam and the other for digging a e of the Ieros Canal. The work was for extensive hydro-electric

A class 60 Atlantic type shovel loading quarry cars at McCook, Ill., for the United States Crushed Stone Company.

shovel digging the basement for the Dee-Eccless e excavation was started with teams, but little of the concrete foundation, wooden beams, gas ntered. It was a rush job. The 14-B was put to yards of the above material in five days.



The Great Lakes Dredge & Dock Company's dipper dredge No. 7 dredging slips for the Hocking Valley Railway Company's new coal and ore docks in the Maumee River, at Toledo, Ohio. The excavation amounted to 200,000 cubic yards, mostly sand. The dredge is a 16x18 Bucyrus boat with a 6-yard dipper.

How the Panama Slide of Oct. 14th and 15th was Handled

In our last number we mentioned the occurance of a slide in Culebra Cut, which temporarily closed the canal to traffic, and which offered an opportunity for the two big Bucyrus dipper dredges to show what they were good for in an extremity such as this. The following from "The Canal Record" of Oct. 21st, speaks for itself:

A large slide on the east bank of Culebra Cut, directly north of Gold Hill, moving between 5 p. m. Wednesday, October 14, and 9 a. m., Thursday, October 15, carried about 725,000 cubic yards of earth and rock into the Canal prism, and blocked the channel for 1,000 feet to the passage of vessels larger than towboats, causing the suspension of traffic. This occured two months, to the day, after the official opening of the Canal to commercial traffic.

The big dredges were working at Cucaracha slide, south of Gold Hill, at the time the slide started, and with commendable foresight on the part of Messrs. Comber and Macfarlane steps were taken to move them northward; but for this action the results secured could not have been accomplished, as the condition of the channel was such that loaded barges could not be passed through the slide. The dredges were worked under triple shift. The 15-yard dipper dredges "Gamboa" and "Paraiso", and the 5-yard dipper dredge "Mindi", began excavation at the north side of the slide during the night of October 14-15, while the mass was still in motion. The dipper dredge "Cardenas" was added to the fleet on October 15, and during the 16th an extension of discharge pipe was laid from a point opposite Cucaracha slide, which allowed the pipeline suction dredge No. 86 to take part in the work.

The channel was cleared sufficiently by noon of Tuesday, October 20, to allow the passage during the afternoon of seven vessels, which had been delayed at the south end of the Canal.

The slide which blocked the Canal is 2,100 feet long, extending from station No. 1775 to station No. 1796, and broke back about 1,000 feet from the center line of the channel. It occured in a part of the bank, formerly involved in the east Culebra slide, and is designated as the "New Culebra" slide. The old slide appeared to be dead, and the channel opposite it had been cleared to almost full width and depth. At the present time, no further movement is indicated, but practically all of the 725,000 cubic yards involved in the movement of October 14-15 will have to be dredged from the prism, which may cause further motion. The material is masses of rock and earth, in about equal proportions.

Following the preliminary survey made on the morning of October 15, after the slide had come to rest, it was estimated that, unless further movements occured, the channel could be opened in one week. A still later estimate set October 22 as the first day on which vessels could pass the slide. The performance of the dredging forces in clearing the channel in two days less time than was believed to be necessary indicates the fitness of the equipment and the loyal persistence of the personnel.

The Governor was greatly pleased with the results accomplished.

The excavation accomplished by the dredges at the base of the slide, in periods ending at 8 a. m. of each day named was:

DREDGE	15th	16th	17th	18th	19th	20th	Total
Gamboa	3,935	5,160	6,175	6,910	7,800	5,775	35,755
Paraiso	4,150	6,900	7,625	7,600	6,720	4,975	37,970
Mindi	1,845	1,000	2,403	2,709	1,640	2,137	11,734
Cardenas	.....	3,027	3,251	2,031	3,210	2,052	13,571
No. 86	.....	.....	3,825	5,850	6,250	4,650	20,575
Total	9,930	16,087	23,279	25,100	25,620	19,589	119,605

The maximum day's output was 25,620 cubic yards, in the period ending at 8 a. m., October 19, or Sunday, when the dredge and towboat crews appeared for duty, without orders or instructions.

Edward Davis was supervisor of dredging, J. J. D. Wieben, general foreman, and R. P. Morgan and Geo. Lytle supervising engineers. The gold employees of the Bucyrus dredges "Paraiso" and "Gamboa" were as follows:

DREDGE "PARAISO"

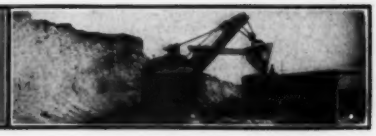
James W. Landers	Master
Lauritz Pettoletti	Chief Engineer
Tony La Sera	Operator
C. H. Hoffman	Operator
C. E. Petersen	Craneman
V. M. Claybourn	Craneman
M. Allgeier	Assistant Engineer
A. Barton	Assistant Engineer
Frank Morton	Assistant Engineer
J. Daly	Assistant Engineer
F. H. Hodges	Assistant Engineer
J. T. Wallace	Assistant Engineer

DREDGE "GAMBOA"

D. W. Hurey	Master
Robert Tweedlie	Chief Engineer
J. T. McGrath	Operator
A. A. Slater	Operator
W. A. Tedford	Craneman
J. J. Murray	Craneman
H. Morrison	Craneman
O. A. Helmericks	Assistant Engineer
F. J. Kruse	Assistant Engineer
V. Salinas	Assistant Engineer
L. Salling	Assistant Engineer
J. Wainio	Assistant Engineer

Press reports state that another upheavel of the bottom of Culebra cut, on the east bank to the north of Gold Hill, occurred about 4 o'clock November 13th.

FIELD NOTES



DISCUSSION IS INVITED FROM MEN IN THE FIELD ON SUBJECTS HERE PRESENTED

Digging Out Boulders.

When a boulder is encountered in earth, it is a temptation to "let 'er have it", and try to rip it out without digging around it first. The sudden strains of this kind of digging are tremendous. It is far better to dig the loose material from around the boulder, and then go to it. It will be found that no time will be lost in so doing.

Raking Back Loose Material with Steam Shovel Dipper.

It is not uncommon to see a shovel runner rake back with the shovel dipper loose material that has been pushed beyond the extreme digging reach of the shovel, or piled at the edge of the loading track, and then try to pick it up. It will be found that if a hole is dug before hand, about the size of the pile of loose material, much time may be saved by scraping this loose material into it instead of trying to pick it up.

Economy of Block Holing

The tests described below, carried on by the Bureau of Mines, should interest contractors and others who have a considerable amount of boulder-breaking to do. The tests were made to determine the comparative energy expended by explosives under water and in the air, and by various methods of shooting.

The test showed very conclusively that the block-hole method of breaking boulders and large fragments of rock is very much superior to and more economical than the mud-cap or adobeshot method of breaking, which is so commonly practiced.

"Adobe shots" were made on two high-grade limestone blocks cut from the same large block and weighing 215 and 203 pounds. Each block was approximately a cube, measuring 12½ by 12½ by 13 inches. The heavier block was selected for tests in the air. It was laid on two 6 by 6-inch timbers, and on the center of the top side a 50-gram 1¼-inch cartridge of the 40 per cent strength low-freezing dynamite was placed. A No. 6 electric detonator was inserted in the cartridge and laid parallel to the vertical bedding planes of the block. The charge was then covered with a 35-pound mud cap consisting of 30 pounds of dry fire clay mixed with 5 pounds of water and fired. The block was not shattered on top, but pieces were split off around the sides. The other block was then immersed in a barrel of water having a temperature of 70° F. The water was 32 inches deep, there being 13¼ inches of water above the block. The charge was the same as in the previous trial except that no mud cap was used, and the charge was coated with paraffin in order to protect it from absorbing water. On firing no apparent damage was done to the block and no cracks were visible. This trial was then repeated on the same block immersed in water with a charge of 100 grams. This greater charge did not break up the block as much as did the 50-gram charge when the block was in air only.

Other similar tests confirmed in every particular these tests, and again the confining effect of the surrounding material was shown. The above experimental proof is presented as a confirmation of practical experience that submarine blasting requires larger charges to disrupt a given amount of material than open work on similar materials.

Block-hole tests were made on two similar high-grade limestone blocks cut from the same large block and weighing 198 and 205 pounds. A hole 1 inch in diameter and 6 inches deep was drilled from the center of one side to the center of the block. Each was charged with 5 grams of the 40 per cent strength low-freezing dynamite. A No. 6 electric detonator was used. The bore hole was filled with water in each case. The 198-pound block was fired in air and the 205-pound block was suspended in a barrel of water in the same manner as in the previous tests. Both blocks were broken. The following tabulation shows comparative results:

COMPARATIVE RESULTS OF ADOBE SHOTS ON LIMESTONE BLOCKS

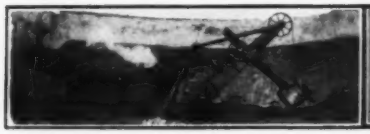
Condition of Block	Quantity of Explosive used	Weight of Block	Weight of Largest Piece	Number of Pieces over 3" in Diameter	Average Weight of these Pieces	Total Weight of small Pieces
	Grams	Pounds	Pounds		Pounds	Pounds
In air	50	215	82	13	15.5	11
In water	*100	203	104	8	24.6	5

*After firing a 50-gram charge.

COMPARATIVE RESULTS OF BLOCK-HOLE TESTS WITH LIMESTONE BLOCKS

	Grams	Pounds	Pounds		Pounds	Pounds
In air	5	198	52	15	12.7	7
In water	5	205	59	11	18.2	5

It will be noticed from these figures that the quantity of explosive used when a block hole had been drilled into the rock fragment was from one-tenth to one-twentieth as large as that required by the mud-cap or adobe-shot method.



DEVICES YOU OUGHT TO KNOW ABOUT

A Practical Machine for the Dredge and Dragline Contractor

THAT part of a contractor's equipment which can be utilized in more ways than one, is sure to be profitable. It is the kind that every contractor appreciates. It is versatility of the dragline which has brought this machine into such universal favor.

We have recently had brought to our attention, the service rendered by an Evinrude Outboard

Fig. 1. Carrying Coal to Dredge with Evinrude Equipped Barge, Swan Lake Drainage Canal, Emmet Co., Iowa

Motor on the drainage work being done by D. C. Stevens of Buffalo, N. Y., in connection with the draining of Swan Lake in Emmet County, Iowa. In a letter from Mr. Stevens, he gives the following information:

"I employ two of the Evinrude Motors, a 2 H. P. and a 3½ H. P., for carrying men and supplies to and from the machines."

Fig. 2. Work Boat of D. C. Stephens, Swan Lake Drainage Canal, Emmet County, Iowa, with Evinrude Motor

"Fig. 2 shows the 2 H. P. motor attached to a flat bottomed boat in which the men are carried 1¼ miles in 15 minutes. Fig. 1 shows the 3½ H. P. motor moving a scow 12 ft. wide, 18 ft. long and

Fig. 3. Contractor Roemer, Lake Okauchee, Wis., Carrying Shingles with Evinrude Equipped Rowboat

drawing 16 inches of water with eight tons of coal for the dredge. This load is moved 1¼ miles in 35 minutes and a trip is made every day."

"The cabin boat, shown on the left bank of the canal, is 15 ft. wide and 45 ft. long and draws 12

Fig. 4. Evinrude used for Power Purposes by the Meyer Construction Co., Milwaukee

inches of water. When it is necessary to move this boat our Evinrude enables us to place it wherever we desire excepting in an extremely heavy wind."

We also show contractor Roemer, of Lake Okauchee, Wis., carrying lumber and shingles to his work; Mr. H. E. Cooper of Honolulu moving two boat loads of stone, the motor being attached to the side of the first boat; a 3½ H. P. Evinrude owned by the Meyer Construction Co., Milwaukee, being used to drive a circular rip saw.

Fig. 5. Carrying Lumber on Evinrude Equipped Rowboat

We are advised by the Evinrude Motor Co., No. 6 Evinrude Block, Milwaukee, the manufacturers of this machine, that they also manufacture a centrifugal pump suited to connect to the motor, the combination forming a very satisfactory sump pump.

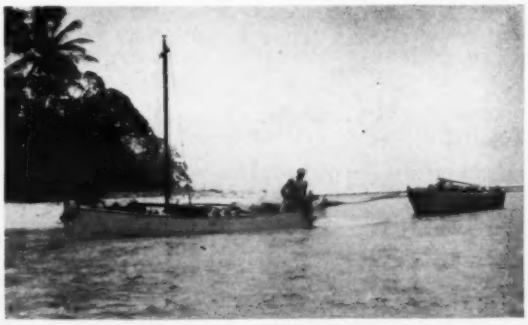


Fig. 6. Carrying Stone in Hawaiian Islands, with Evinrude Equipped Sail Boat

Surely this little motor seems to be most practical in its adaptation to contractors services, inasmuch as it can be used to propel water craft or for small power requirements on land.

In connection with drainage work, a contractor can equip the row boat which is usually a part of dredge equipment, with an Evinrude motor and save much time in getting to and from shore or bringing supplies over considerable distances. The 2 H. P. motor will drive an ordinary row boat about 7 miles per hour. The manufacturers tell us that the 1915 model will embrace an automatic reversible feature which adds 100 per cent flexibility to the 1914 model.

Change in Zelnicker Personal

Mr. Ralph H. Wilson, who has been with the Walter A. Zelnicker Supply Co. for about two years and recently representing this concern in the Southeast, has been appointed Advertising Manager. Mr. Wilson's position will be filled by Mr. Prichard formerly Auditor of the St. Louis Car Company.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review in this column such books and catalogs as are sent to us. Books reviewed in these columns will be supplied by The Excavating Engineer Publishing Company at the prices named.

SMITH MIXERETTE—The subject of a folder recently issued by the T. L. Smith Company. The machine discribed is a Small Batch Mixer, weighing 2500 pounds complete. It takes a batch of 5 cubic feet of loose material and holds three cubic feet of wet material without splashing. It has a capacity of 40 to 60 cubic yards of concrete per day. Its various unique points are well described and illustrated in this folder.

THE T. L. SMITH CO.
1125 Thirty-Second Street,
Milwaukee, Wis.

Don't Stop!

By Rudyard Kipling

If you stop to find out what your wages will be
And how they will clothe and feed you,
Willie, my son, don't you go on the Sea,
For the Sea will never need you.

If you ask for the reason of every command
And argue with people about you,
Willie, my son, don't you go on the Land,
For the Land will do better without you.

If you stop to consider the work you have done
And to boast what your labor is worth, dear,
Angels may come for you, Willie, my son,
But you'll never be wanted on Earth, dear!

Even so

"All women are rivals when it comes to clothes."

"Yes; each one tries to outstrip the other!"—*Harvard Lampoon.*

Too Much For Him

SUBURBANITE: It's simply fine to wake up in the morning and hear the leaves whispering outside your window."

CITYITE: It's all right to hear the leaves whisper, but I never could stand hearing the grass mown!—*Stray Stories.*

SHOTS FROM THE FIRING LINE

Alabama

Bridgeport—G. R. Hurd of the Dixie Contracting Company advises us that his company has finished their double-track work between Bridgeport and Stevenson and has moved their 70-C Bucyrus to South Pittsburg. They are digging slag for ballast for the Nashville, Chatanooga & St. Louis Railroad, and are using three locomotives and three flat-car trains. On November 13th they made a run of 86 flats in two hours and 55 minutes. The slag is being drilled with a Cyclone drill. Mr. Hurd is running the shovel and has charge of the work. C. D. Hutton is craning for him and Joe Hurd firing.

Camden—A contract has been awarded D. R. Cook & Co., Selma, Ala., at $11,867.26 for surfacing Camden and Millers Ferry road. Will require 4½ miles grading, draining and surfacing with clay gravel.

Wedowee—A contract for grading, draining, top soiling, etc., 6½ miles of road was awarded to Nixon Smith Construction Co., Deatsville, Ala., at $8,000.

Arkansas

Wynne—A contract has been awarded S. Coleman & Sons, Paragould, for constructing a drainage system in drainage district No. 3 at $192,000. Will include 2,325,000 cubic yards excavation and ditching over territory of 75 miles, 900 feet corrugated iron culvert pipe and 15 iron bridges with concrete abutments.

California

Sonalo County—Contract awarded P. H. Hoore, Oakland, Calif., at $40,357 for constructing part of highway. Will include 20,000 cubic yards excavation without classification, $13,000; 200 feet 12-inch, 72 feet 18-inch, 120 feet 24-inch and 24 feet 36-inch corrugated iron pipe, $180; 100 cubic yards class "B" cement concrete for culverts and monuments, $1,150; 8,100 cubic yards cement concrete, class "B," for pavement, $25,515; 1,050 feet guard rail, $420, and 92 monuments $92.

Colusa County—Contract awarded C. W. Cross, Oakland, Calif., at $55,061.80 for constructing section of highway. Will include 37,500 cubic yards of excavation with classification, $25,500; 120 feet 12-inch, 216 feet 18-inch and 48 feet 24-inch corrugated iron pipe, $130.80; 150 cubic yards class "B" cement concrete for culverts and monuments, $1,350; 8,600 cubic yards class "B" cement concrete for pavement, 24,510; 10,000 feet guard rail, $3,500 and 71 monuments, $71.

Glen County—Contract awarded C. W. Cross, Oakland, at $40,813.60 for constructing section of highway. Will include 22,000 cubic yards excavation, without classification, $13,200; 240 feet 18-inch and 264 feet 24-inch corrugated iron pipe $189.60; 360 cubic yards class "B" cement concrete for culverts and monuments, $3,240; 8,400 cubic yards class "B" cement concrete for pavement, $23,520; 1,500 feet guard rail, $600 and 64 monuments, $64.

Imperial County—Contract awarded W. F. Callahan and P. L. Hedrick, El Centro, Calif., at $63,233.10 for constructing highway. Will include 19,300 cubic yards excavation without classification $5,790; 104 feet 18-inch, 52 feet 24-inch and 38 feet 30-inch corrugated iron pipe, $121.20; 25 cubic yards class "B" cement concrete for culverts and monuments, $237.50; 11,500 cubic yards class "B" cement concrete for pavement, $56,350; 1,200 feet guard rail, $660, and 124 monuments, $74.40.

Bakersfield—Contract awarded F. H. Jameson, Glenville, for construction 5.6 miles highway beyond Poso Creek on Bakersfield-Glennville Road.

Canada

Cedar Rapids, Quebec—The accompanying photograph shows Frazer, Brace & Co's 70-C Bucyrus shovel at work near Cedar Rapids. The machine is operated by "Big" Tim Hansberger. It is at present in a rock cut. It succeeded in turning out between 30 and 31 thousand cubic yards of rock in May of this year.

New Glasgow, N. S.—McDougal Bros. 70-C Bucyrus shovel slamming away in hard rock digging on the East River improvement work, at New Glasgow, N. S.

Washago, Ontario—C. H. Flynn has recently completed the erection and test of Randolph, McDonald Co's new class 24 Bucyrus dragline excavator near this point.

St. Catherines, Ont—Wm. Lundquist is operating the night shift on a class 20 Bucyrus dragline excavator for Yale & Reagan on the Welland Canal.

Montreal and Vicinity.

L. A. Ott & Co. have closed down the 18-B Bucyrus revolving shovel which has been excavating material for the new McGill Stadium here on account of weather conditions. They are still making good headway on this job and will finish on time.

The Glengarry Construction Company who have a contract for building the Stormount & Glengarry Railway expect to have this road in operation by December 1st. The above road is 27 miles long and runs from St. Polycarpe to Cornwall, Ont., and is a first class line in every respect, the station buildings being without exception the finest for a new road that we have seen in Canada.

It is reported that Laurin & Leitch will start on their contract for the Park Avenue sub-way within a short time as the proportion of cost to be borne by the City and Railway Commission has been adjusted.

The very heavy and unusually early snow fall which we have had here while giving work to a great many idle people has closed down road building and other contract work earlier than expected.

Vancouver and Vicinity.

Prof. Geo. A. Guess, of the Department of Metallurgy, University of Toronto, is at present in Anyox, B. C., where he has been engaged for a short time in a consulting capacity by the Granby Co. in connection with their new smelter.

F. N. Smith, resident engineer of construction, Canadian Northern Pacific Railway, Henningsville, B. C., and D. R. Weber, assistant superintendent, Grant Smith & Co. and McDonnell, Limited, Revelstroke, B. C., have recently attained associate membership in the American Society of Civil Engineers.

The C. P. R. is driving a tunnel 400 feet long near Shields, on the Columbia and Western Branch. A steel bridge is also being built near Brilliant to replace a timber trestle. W. P. Tierney & Co. are the contractors.

C. G. Griffin who had charge of the work on the Kettle Valley Line at Kelowna, for Grant Smith & Co. has returned to Vancouver and reports everything finished up slick and clean.

Construction work is now in full swing on the bridge for the Canadian Northern Pacific Railway to be built near Walhachin, at the first crossing of the route west of Kamloops. The structure is expected to be completed by the end of next month when track-laying will be extended along the north shore of the Thomp-

son towards Lytton and Cisco, where gangs are now engaged in extending the new line eastwards.

Mr. J. W. Stewart, president of the Pacific Great Eastern Railway, announces that construction is proceeding with undiminished vigor all along route of the new line from the end of steel near Pemberton to Fort George. He said that a force of nearly 7000 men is engaged in the task of projecting a new line into the interior. Incidentally, he mentioned that a sum aggregating between $1,250,000 and $1,500,000 was being spent each month in the work of construction.

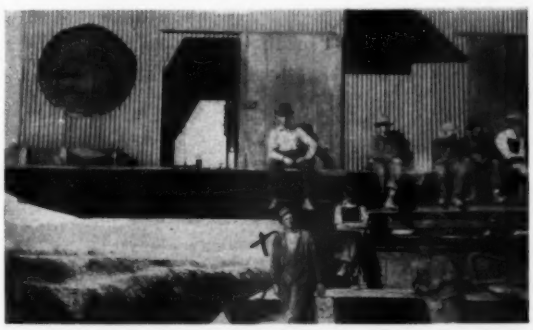
The Grand Trunk Pacific Railway has let contracts for the construction of buildings at four of its divisional points along its main line in this province. Buildings will be erected at Endako, Smithers, Prince George and Pacific at a cost of $300,000. Twelve-stall roundhouses will be erected at each town. Contracts to build machine shops, stations and warehouses at Prince Rupert will shortly be let and oil tanks for storage along the line will be built. The Imperial Oil Company will install a storage plant at Prince Rupert, to cost $250,000.

The double-tracking of the British Columbia division of the Canadian Pacific Railway has now been finished and is ready for traffic on the sections west of Kamloops and west of Revelstoke, and only a small portion of ballasting remains to be done on the portion being paralleled east of Kamloops. The completion of the sections will provide an additional sixty miles of double-track facilities on the main line in British Columbia. The Canadian Pacific Railway has now more than 140 miles of its main line double-tracked in this province. The company has 400 men employed on the main line of the British Columbia division on the extra work started to relieve the out-of-work situation.

Steel has been laid to Otter summit by the Vancouver, Victoria and Eastern Railway which there connects with the Kettle Valley Railroad. This gives indirect connection with the coast via Merritt and Spence's Bridge. It will be possible to reach Vancouver in one day from Princeton by this route. When the Coquihalla pass route is finished the run to Vancouver will take six hours.

Colorado

Grand Junction—A contract has been awarded Thorn & Whiting, Springville, Utah, at $9,180, for earthwork on Main Canal, Grand Valley project, Colorado.



F. A. Mengel, Night Supt., Winston Bros.. and his crew, on a Class 20 Bucyrus dragline, on the High Line Ditch, Grand Junctioh, Colo.

Denver and Vicinity.

By H. N. Steinbarger

The sixteen mile branch line railroad built jointly by the Denver & Rio Grande Railroad Co., and the Hallack & Howard Lumber Co., of Denver from Caliente station on the D. & R. G., to La Madera, New Mexico was ready for operation about November 15th. This line will open up a country rich in lumber and greatly reduce the cost of handling. The grading was done by contract with Charley Wells a well-known contractor of Denver, Colorado. To hasten the work sub-contracts were let to Allen & Lafferty and Crook & Hoffman both of Denver. Their outfits are now all in storage in Denver where it is possible they will remain for the winter.

The Burlington line through Wyoming which connects with the Colorado & Southern Railroad at Orin Junction, Wyo. on the south and with the old Burlington line at Powder River, Wyo. is now complete. Thus the so-called Gulf to Coast line is finally in operation. Trains are now running regularly and with through Pullman service. This line ought to enhance the value of lands through which it passes. It has turned the channels of trade toward Denver which is a great benefit to both sections.

Bids were opened at Provo, Utah on November 16th for construction of divisions one, two and three of the High Line canal and structures on the Strawberry Valley project of the United States Reclamation Service near Thistle, Utah. The work involves approximately 384,000 yards of canal excavation, 2300 yards of excavation for structures, 167,000 square feet of canal lining and various other work. The canal will extend in a southwesterly direction from near Payson City Utah to the mouth of the Spanish Fork canyon. It is reported to us as this issue goes to press that the Mendenhall, Straw, Bird Company a combination of Springville, Utah contractors were low bidders on sections Nos. 1 and 3, and Rideout & Andrus of Draper, Utah, were low on section No. 2.

Word comes from Grand Junction to effect that the Winston Bros. Company are making great progress on the contract for the U. S. Reclamation Service on the Grand Valley project. They are making a good record with their big Bucyrus draglines. A great deal of shale has been encountered in some places but it is being handled with the drag lines in good shape. The entire line of the High Line canal is now covered with their own equipment and that of their sub-contractors.

Not a word from "Brigham" Young since he left over a month ago for the east and the big baseball series. We were greatly worried for some time until we learned that Mrs. Young accompanied him. It was we assure you quite a relief for we know that he is safe and will in due time return to his home town with new spirit and energy. He has been rather closely tied down to his business for some time and the vacation will make a new man of him. What he will do to that pitch game at the Denver Pitch Club will be a plenty. By the way when we say Denver Pitch Club it really means the Davies Pitch Club. It really has not been re-organized for the winter but it will be for lately Jim Davies has been stirring around in a nervous manner looking up the members and telling everybody that he wont play this year, just intends to see that everybody is comfortable and in good spirits. Now we don't mean the kind of spirits that cheer. Jim doesnt have that kind around, and he doesnt need it for there is always the glad hand extended and that beaming smile to greet a fellow and makes him want to come back for more.

We have just learned of what we deem a pretty good record in handling earth. C. R. Conever of Arvada, Colorado has a contract on the Hawk Springs Development Company's canal work near La Grange, Wyoming. He is using one Austin New Era elevating grader loading into one and a half yard wagons using ten such wagons for the purpose. During the month just past he handled and received an estimate for 27,000 yards all excavated in twenty six working days. There is no questioning this record as he received the estimate and was paid for it. That's going some but he has done better on other jobs in the past.

Idaho

Twin Falls—A contract has been awarded Helmer & Mull for constructing road and bridge work on east and west highway passing through county. Will cover 50 miles of road.

Illinois

Kankakee—A contract has been awarded the R. H. and G. A. McWilliams Co., Chicago, for constructing 28 miles ditch 15 feet deep and 100 feet wide to divert Kankakee river for elimination of curves, at $300,000.

Notes from Chicago.

A. W. Nyquist is promoting a railroad in Ohio. This is a bad time to promote a railroad, however, Mr. Nyquist's many friends believe he will be successful in carrying out his project. He is located at Akron, Ohio.

Ed. Deavonshire formerly of Deavonshire & Maxfield has returned to Chicago. Ed. has been at Halifax, N. S. with the Cook Construction Co. for some time.

The Raulf Engineering Co. of Milwaukee are just starting their work at Whitewater, Wis. They have rented an entire steam shovel plant from Clapp Norstrom & Riley, of Chicago.

M. C. Connors & Co. have second contract from C. B. & Q. R. R. at Galesburg, Ill. and have let same to J. C. Parquette. Lost no time in getting work started.

John Kahl, brother of the only and original Hummer Kahl of the Walsh Construction Co. spent a day in Chicago.

Tom Walsh vice-president of the Walsh Construction Co. dropped in the other day for a visit. Tom is very optimistic about the future. That is right Tom, we feel the same way and expect a good business next year.

Cleary-White & Duffy Co. have just purchased a Bucyrus 14-B shovel for their work at Cedar Rapids, Iowa.

E. M. Hall has returned from his southern trip. He was not only successful in securing the business he went after, but sold two new Davenport locomotives last week. Ned you are the real stuff.

H. F. Riley of Clapp Norstrom & Riley is always busy. If he is not selling equipment he is buying horses and shipping them to his stock farm in Michigan. Last week he purchased one hundred and twenty acres more which gives him now about 640 acres. Making one of the finest farms in Michigan. As he is the father of four children, the oldest not over seven years old, we can see where the farm will come in very handy.

McDonald & O'Connor of Grand Rapids, Mich., have completed their contract at Grand Rapids, Michigan, and are ready for another contract.

Messrs. Lowe and Steers of Kalamazoo, Michigan report a good year. They are busy building county roads.

Andrew Ward of A. Ward & Sons of Oak Glen, Ill. was a caller the other day. Andy is young as the rest of us and reports finishing his state road near Momence, Ill.

W. J. Stein of Harvey, Ill., lately of the firm of Stein & Lamb, was calling on friends in the city. He reports his work near Momence, Ill. as being finished. Bill is looking fine and will be ready for anything that opens up.

W. E. Long of Tampa, Ill. who has a drainage job near Sheffield, Ill. was called to the city on account of his father's death. We extended our sympathies.

Iowa

Mason City—The Lehigh Portland Cement Company has recently installed a Bucyrus 14-B revolving shovel. The machine is being used to strip the overburden from the rock deposits and do away with the slower hand labor. It is expected that this machine will lessen overhead expenses and have a tendency to increase the output of the big shovels in the rock. G. W. Dunphy erected and tested the machine.

Cedar Rapids—Geo. Stanbery has recently completed the erection of a 14-B Bucyrus revolving shovel for the Cleary-White Construction Company here.

Kansas

By W. S. Russell

There has been practically no change in weather conditions during the past month and the coal market remains about the same. The weather most of the time has been clear and cool, which has been favorable for outdoor work and stripping operations. Prices are the same as last month and we quote as follows: Lump per ton $2.25; nut per ton $2.00; mine run per ton $1.35, f. o. b. railroad cars at the mines.

Pittsburgh now claims to have over 20,000 population and general business is good. There was a great celebration on Nov. 5th, being carnival night, when the new system of electric lights were turned on for the first time. Broadway, the main street was brightly illuminated for many blocks, as were the cross streets along the business section. The street was crowded and jammed with people at 7:30 when the lights were turned on. Whistles blew, bells rang, horns were tooted and bedlam let loose. There was a street parade, bands of music, automobiles in line and everything but fireworks. Strangers need have now no fear of getting lost on Broadway.

The next event of note is the installing of the largest steam shovel in the world by the Bucyrus Company near Mulberry for the Carney-Cherokee Coal Company. This mammoth steam shovel is of the latest design, built especially for stripping coal. It took eleven car loads to transport it from the works at South Milwaukee, Wisconsin, and its weight in working order will be over 290 tons. It is fitted with a 75-foot boom, a 6-yard dipper holding over 7 cubic yards, heaped up, and will have a capacity to dig over 4,000 cubic yards of earth per day of nine hours.

The Bucyrus Company now have a large number of coal stripping shovels in the Kansas field that have proved very successful and satisfactory. It is expected this new shovel will be in operation by the middle of December and will be viewed with interest by many of the coal strippers. John Elliott of the Bucyrus Company is in charge of the erection.

The Ideal Coal Mining Company of Hume, Mo. placed an order last month with the Bucyrus Company of South Milwaukee, Wis. for one of their 150-B revolving steam shovels. They will open up a field of strip coal near Hume on the Frisco railroad. An up-to-date tipple is now being built and necessary tracks put in to handle the coal cars. Elmer Whited is president and manager, A. L. Billings secretary and treasurer.

Robert Nesch, president the Nesch Coal Co., spent several days at Pittsburg recently. He reports having purchased a revolving crane for loading the coal into tram cars. This company are operating a 175-B Bucyrus steam shovel at Frontenac, stripping coal for the Santa Fe Railroad.

The firm of Smith, Scott & White are operating three 175-B Bucyrus revolving steam shovels on their field near Chicope, stripping coal for the Central Coal & Coke Co. This plant presents a busy appearance these days, with the steam shovels working and the dinky locomotives hauling the trains of loaded tram cars to the tipple and empties back to the field.

The Besse-Cockrill Coal Co. of Pittsburg, who are stripping coal about a mile south of Weir City are offering their model 28 Marion ¾ yard revolving steam shovel for sale. This shovel was used for loading the coal in the pit but owing to unfavorable conditions, its use has been discontinued.

J. F. Klaner has returned from his hunting trip up in the big woods of Canada and reports having had an enjoyable outing.

One good thing about the Kansas coal field adjacent to Pittsburg is the excellent car service performed by the Joplin & Pittsburg electric car lines. These lines reach practically most of the small towns and coal mines, with a half hour service. The cars run on time and are a great convenience to the public.

John Hodges of the Pittsburg-Midway Coal Company had quite a spell of sickness last month and his many friends will be glad to hear that he is up and around again.

O. K. Dean of the Stilwell Hotel has some strip coal land for sale. Call and see him.

W. M. Bager, assistant chief engineer Bucyrus Company of South Milwaukee, Wis., spent several days at Pittsburg last month looking over coal stripping and the operations of Bucyrus shovels, on which improvements are being made to make them as near perfect as possible.

The new six million dollar Union Station at Kansas City was opened on Nov. 1st, after a big blowout, and is a magnificient structure. One good result and benefit to Pittsburg is that the Kansas City Southern Railroad runs in there and has put on a new morning train north. The Frisco Railroad has followed suit and put on a new train leaving Kansas City at 8:50 A. M. south bound, also one leaving Joplin at 4 P. M., via Pittsburg, north bound, which is a great convenience to travelers.

There are good opportunities for parties having means to engage in coal stripping in the Kansas field. Strip coal land can be bought or leased at reasonable prices. Further information will be furnished by the Pittsburg Machinery Company, 806 North Broadway, Pittsburg, Kansas.

The Bucyrus Company have a stock of repairs for their coal stripping steam shovels at the Pittsburg Machinery Company store room, which is a great convenience to owners of Bucyrus shovels.

The Pittsburg Machinery Company are located at 806 North Broadway, where they occupy an entire building with a large stock of coal miners, mill and contractors' supplies, tools and machinery, engines, pumps, motors, etc., also repairs for Bucyrus steam shovels. Give them a call.

Massachusetts

Monroe Bridge—Phil. E. Ryan of North Wilbraham, is operating a 70-C Bucyrus shovel for the Power Construction Company here. This company has two 70-C and two 60-C Bucyrus steam shovels at this point in hard digging.

Michigan

Grand Rapids—A contract has been awarded P. McDonald, Duluth, Minn., at $28,682.78 for constructing 15 miles road, turnpike, through northwest part of county.

Battle Creek—A contract has been awarded John T. Adams, Columbus, Ohio, by Battle Creek-Coldwater Railroad Company for constructing its line from Battle Creek, Mich., to Coldwater, Mich.

Mississippi

Vicksburg—The contract for levee enlargement along the Arkansas river, requiring the placing of two million yards of earth, has been awarded to John R. Scott, St. Louis, Missouri.

Minnesota

Red Lake Falls—A contract for excavating 35 miles of ditches has been awarded to D. A. Foley & Co., Aitkin, Minn., at $41,087. Will contain 424,208 cubic yards earth excavation, 75 corrugated metal culverts and 1,298 cubic yards reinforced concrete.

Minneapolis—A. Guthrie & Co., St. Paul, Minn., have been awarded contract for completing new cutoff from Minnesota River to new terminal at 7th St. and 3rd Ave. N. for Minneapolis, St. Paul, Rochester & Dubuque Traction Co. (Dan Patch Line).

Montana

Malta—The contract for constructing Nelson Reservoir Outlet Canals has been awarded by the U. S. Reclamation Service to the Security Bridge Company, Minneapolis, Minn.

Nevada

Fallon—Contract for grading the Fallon Electric Ry. from a point on the east line of Phillips and Gibbs ranch, working on to Sand Springs, a distance of 16 miles, is reported awarded to the Berney Construction Co. The railway's headquarters are at Fallon, Nev.

New Jersey

Trenton—Russell Klockner of Trenton has a nice piece of road work between Hopewell and Mt. Rose, N. J.—excavation about 60,000 cubic yards—Macadam about 40,000 yards. This work is about half completed. He is using a 14-B Bucyrus, operated by D. Klockner Jr.

New York

Brooklyn—Harry Laura is craning a shovel here for Richards & Gaston.

Albany—A contract has been awarded Great Lakes Dredge & Dock Co., 104 South Michigan Avenue, Chicago, Ill., at 40 cents per cubic yards for dredging in Albany Basin. This will include 65,500 cubic yards.

Troy—The Ruddy Saunders Construction Co., of Troy, has a 14-B Bucyrus on their road work between Fisks Eddy and Hancock, N. Y. T. J. DeLee reports that this shovel has done some good work in rock and is now loading from 4 to 5 hundred two-yard wagons per day in good digging. He states that they have loaded as much as 67 two-yard wagons in one hour. They have about 80,000 yards left to complete the work, and expect to operate the shovel all winter. This Company have two small Thew shovels working near Cadosia, N. Y. Louis Klein is engineer on the Bucyrus 14-B. C. Farnelli is foreman.

North Carolina

Browns Summit—The Henderson Contracting Company have 10 miles of heavy work on the Southern, double-tracking between Greensboro, N. C. and Danville, Va. They are using 60-C and 40-C Bucyrus shovels, one on each end of the work. The shovels have been rented from the Morrow Construction Co., of Atlanta, Ga. Charles Dephne is operating, E. McKinney is craning and W. A. White firing the 40-C and they are loading between 325 and 380 twelve-yard cars per 10 hour shaft. The 60-C is being operated by engineer Auldeg with J. Austin as cranesman. Mr. Auldeg says that he has been on lots of shovels in his time, but has never struck a machine which is so smooth running in hard digging as the 60-C. The shovels have been on the job for about nine months, and it will take nearly 10 months to complete it. We are indebted to James C. Collins of the Henderson Contracting Co. for this information. Mr. Collins who is a shovel man has charge of the plant at night.

Ohio

Columbus—Following contracts were awarded for constructing roads in various counties: Morgan Bros., Ravenna, at

$6,980, for Unity-Salem road in Columbiana Co., brick; Rolla M. Myers, Attica, at $21,999 for Eden-Cooney road in Williams Co., macadam, 1.50 miles; Frank L. Cohen, Buffalo, N. Y., at $102,805, for Canton-Massillon road in Start Co., brick, 4.35 miles; Enterprise Pav. & Constr. Co., Cleveland, at $54,983.85, for Wooster-Massillon road in Wayne Co., brick, 3.17 miles; J. C. Gannon, Ironton, at $10,000, for Jackson-Ironton road in Lawrence Co., grading three miles; John M. Wheeler, Cadiz, at $11,343, for Cadiz-Carrollton road in Harrison Co., macadam, 1.67 miles; A. W. Burns, Columbus, at $81,820, for Portsmouth-Columbus road in Scioto Co., brick, 5.2 miles; Forest Construction Co., Richmond, Ind., at $18,887.50, for Ohio River road in Monroe Co., concrete, 1.08 miles; L. H. Young Construction Co., Youngstown, at $42,520.43, for Cleveland-East Liverpool road in Summit Co., brick, 2.43 miles; Gray Bros., Bowling Green, at $21,570, for Toledo-Napoleon road in Lucas Co., macadam, two miles.

Pennsylvania

Pittsburgh—Walter J. Person is operating a model 36 Marion here.

Philadelphia—Geo. W. Williams is at the present time erecting a 14-B Bucyrus revolving shovel for Thomas Connor here.

Notes from the Anthracite Region.
By E. G. Lewis

Scarcity of water has necessitated a number of the stripping operations in and around the Hazelton and Shenandoah Districts to shut down.

A. E. Dick's work at William Penn has been closed down for six weeks and the immense stripping operations of The Central Pennsylvania and Quarry Company has only just resumed after a shut down covering a period of sixty days.

Mr. Edward Newbaker general superintendent for the Lehigh & Wilkes Barre Coal Co. was confronted with the serious proposition of putting a Bucyrus 18-B shovel on the summit of a ten million ton culm bank. It seemed to those in charge of the operation that nothing short of a powerful Zeppelin or a sky hook would accomplish the job. However the job was finally accomplished by digging her way up. This was accomplished by working on a grade of from 12% to 16%. Some climb I should say.

A. E. Dick of Hazelton is wearing one of the broadest smiles now to be seen in the coal regions. It's due to the nice estimate received for his Honey-Brook operation in September. Forty-five thousand yards was credited to his new Bucyrus 85-C. This was the first full month that the shovel was operating as it was installed in August. The shovel is loading into Western 8-yard cars and let me incidentaly add that these same cars averaged for the month nine and nine-tenth cubic yards per car. The work is exceptionally well organized and is under the personal supervision of Mr. William Dick.

The work is being done for the Lehigh & Wilkes Barre Coal Co. and includes the stripping of the Mammoth Vein. The basin is long, wide and rather shallow which allows of a splendid track arrangement that Mr. Dick has ably taken advantage of. They have laid a circular or run-around track to the shovel which eliminates shovel delays. The dump is situated 3800 feet from the shovels present position and four trains are in operation. The material for the first cut consists of clay and soft limestone. Two Keystone well drills are kept busy ahead of the shovel. We present a photograph of the shovel in operation which shows the loaded train leaving the shovel and the empty train ready to back in .

The Porter Bros. work at Wilkes Barre, the connecting railroad for the D. & H. and Penna., has been progressing slowly this Spring and Summer on account of the high stage of the Susquahanna River during the early Summer months. The bridge piers and abutments are well on toward completion at this time and it is expected that the road will be turned over to the operating department early next year.

Charley Smith of Mahanoy City says he is happy as every man should be who is so fortunate as to own a 70-C Bucyrus and have plenty of work for it.

B. H. Stockett, superintendent of the Locust Mountain Coal Co. at Shenandoah, Pa. reports all hands working even the cook. Their 18-B shovels, all in coal, are loading from one hundred to one hundred and fifty cars of coal daily (nine hour shifts) these cars measure up 135 cubic feet water level.

Philadelphia and Vicinity.
By E. G. Lewis

James F. Brogan reports that his Pennsylvania work at Mt. Union, Pa. has been indefinitely closed down.

Latta & Terry are making good progress on the Penna work at Snow Shoe Pa. Wm. Pritchard is operating their 14-B Bucyrus.

Jim Dorgan is operating a 14-B Bucyrus for Thomas Connor in Philadelphia, the work is street grade reduction for the City and comprises about 60,000 yards. Mr. Connor has recently purchased an 18-B Bucyrus which he will put on similar work.

Edward L. Bader of Atlantic City has just been awarded a contract at Dunellen, N. J. A large sewerage disposal plant.

Rhode Island

Providence—D. Hennesay is operating, D. Sheehan craning and W. Wheeler firing a Bucyrus shovel for Wilson & English Construction Company here. The timekeepers on the work are J. Fields and J. Hennesay.

Texas

Van Horn—A contract for constructing standard-guage railway from Van Horn, Tex., to point near New Mexico line has been awarded to King & Runquist, Duluth, Minn., by the Van Horn Valley Land & Railway Company, and line will be about 90 miles long.

Virginia

Richmond and Vicinity.
By J. G. Skelton

The engineering world was thunder-struck recently by a description of a most remarkable locomotive, with which Mr. W. T. Dabney, business manager of the Richmond Chamber of Commerce, elucidated those who were fortunate enough to attend a luncheon given by the Albany Rotary Club of Albany, N. Y. not long ago. This description should be of interest to shovel men, and we give it in full below:

"The largest locomotive in the world is in Richmond, Va. It has five acres of grate bars and four acres of netting in the smokestack. It takes a man a day and a half to walk through one of its cylinders. It has an elevator running up to the headlight, and it takes ten barrels of oil to fill it. It takes two men forty-five minutes to light one signal light, and it took fifteen carpenters

nine months to build her pilot. They have a steam shovel to give her coal. The tender holds ninety-seven carloads of coal. Every time she exhausts it rains for thirty minutes. The engineer uses a searchlight to look out for signals, and goes blind after running for six months. It takes two astronomers with powerful telescopes to see her going. The pony wheels are the size of monster turntables in this country, and a section of the Pacific cable is used for the bell cord. It takes forty-eight hours for one spark to fall. When the whistle blows it causes an epidemic of deafness in Norfalk 100 miles away. Monster trees have been broken from the wind of this train. She runs from Richmond to Rockfish, a distance of eighty-four miles, in fifty minutes, making her tunnels as she goes. She hauls 1,743 cars, and the roundhouse force hold their annual picnic in her firebox every summer. When they wash her boiler it is necessary to drain the James River. She carries 1,860 pounds of steam and 940 pounds of air. The throttle is pulled by a stationary engine in the cab. The lubricator holds fourteen barrels of oil. When she leaves the rails there is an earthquake in Petersburg four days later. This train goes so fast that when it stops it is still going ten miles an hour.

The glare of the headlight can be seen through a hill half a mile thick. When she takes water she dries an ordinary lake, and lowers the water level of the river several feet."

J. J. Boxley & Son of Roanoke, Va., have been awarded a contract by the Norfolk & Western Railway to grade five miles of railroad and build a 300 foot tunnel from Riffe, W. Va., to Cucumber Branch, of Dry Fork of Tug River.

The line will open up mining properties of the Burwind Coal & Coke Company. The estimated cost of the work is about $275,000.00 and the contractors, who have just completed another job for the Railroad Company on Wolf Creek, near Narrows, Va., will push the work immediately.

The line will follow Jacobs' Fork from Rifle then go through the tunnel and up Cucumber Branch.

There will also be three steel bridges, with concrete piers, besides sundry concrete culverts.

The total amount of the yardage involved will be about 307,000 cubic yards, which includes the tunnel.

The contractors expect to have the work completed within about eight months and will use two large steam shovels, a liberal number of teams and about 200 laborers.

M. P. Moore of Kannapolis, N. C. has been awarded contract by commissioners for Kerr and Sills Creeks Drainage District for the removal of 339,178 yards of material, and other work necessary to drain Kerr and Sills Creeks. The estimate cost is $22,709.92. (Kerr Creek District issued $12,000 bonds and Sills Creek $18,000 bonds.)

W. I. Lee, chief engineer, macadam road construction, Princeton, W. Va. recently awarded sixty miles of road work to the following:—Vaughn Construction Co., Roanoke, Va. T. Towles & Company, Roanoke, Virginia. Sullivan & Tilson, Bluefield, W. Va.

John B. Bedsole of Autryville, N. C. has been awarded five miles of sand-clay road work in Cumberland County, N. C.

West Virginia

A contract has been awarded by Big Bend Coal Co. to Ryan & Co., Lexington, Ky., for constructing 2½ miles railroad around Hatfield Curve near Mattewan.

Morgantown—The Morgantown Interurban Ry. has let contract to J. A. Vandergrift, New York, to build its line from Morgantown, W. Va., to Point Marion, Pa., 9½ miles, through rough country. J. H. McDermott is president, treasurer and general manager; S. D. Brady, vice-president and chief engineer and L. S. Miner, secretary. Other directors are H. R. Warfield and Davis Elkins.

Wisconsin

Whitewater—Raulf Construction Co., Patton Bldg., Milwaukee, has started grading work for extension of electric railway of Badger Railway & Light Co.

Kingston—A contract has been awarded Cleary, White & Duffy Co., by the Chicago & Northwestern Railway Co. for constructing Kingston-Crandon line in Wisconsin.

PROSPECTIVE CONSTRUCTION

Alabama

The Gulf, Florida & Alabama Railroad has secured funds, it is said, to complete the work on the extension from Broughton, Ala., to Pine Hill, 50 miles.

The Gadsden, Bellevue & Lookout Mountain Railroad which operates an electric line connecting Gadsden, Ala., with Noccalula Falls, 3.1 miles, is to build an extension between Gadsden and Center, the company expects to start surveys for the extension in about 60 days.

It is contemplated by the Nashville, Chattanooga & St. Louis Railway Co., Guntersville, to extend line from Guntersville to Hobbs Island. Cost about $700,000.

Huntsville & Florance Interurban Railway Co., Huntsville, Ala., is making preliminary arrangements to begin work soon on construction of line between Huntsville and Florance.

Arizona

An extensive reclamation undertaking is contemplated by the Cibola Valley Irrigation District. This project will amount to about $800,000.00, and will reclaim 17,264 acres; a large amount of levee construction and canal excavation is included.

Arkansas

W. H. Newsom, engineer, court house, Marion, Ark., will receive bids until December 7th, for excavating about 5,164,000 cubic yards earth in the Crittenden drainage district No. 3. All except about 1½ miles, which is team work, is floating dredge work.

California

State Highway Commission, Sacramento, has agreed to advertise for bids for the construction of 11 7/10 miles of highway from Yuba City to the northerly boundary of Sutter County;

to be of concrete-macadam construction and estimated to cost 89,000 per mile.

It is contemplated by Pacific Electric Railway Co., Geo. E. Pillsbury, chief engineer, Los Angeles, to construct eight miles of line from Harrison street, Riverside, to Corona.

Canada

The Pacific, Peace River & Athabaska Ry., which was organized in Canada, to build from a point on the Pacific coast east to Prince Albert, Sask., about 1,500 miles, has asked the Canadian parliament for authority to build railway lines from tidewater near the head of the Kitimat arm, British Columbia, along Kitimat river, in a northerly direction and via the valley of the Lakelse Lake and river to the Skeena river, which is to be crossed by a high level bridge, thence to the valley of the Nass river, near Aiyansh, about 112 miles; also to build a 57-mile line from a point on the Nass river to the summit between the Blackwater river and the Galankeest river, thence to the Skeena river. and up the Skeena river to the mouth of Bear river. Pringle, Thompson, Burgess & Cote, Ottawa, Ont., are solicitors for applicants.

Ontario Municipal Electric Ry. will probably let contracts next summer to build from Toronto, Ont., northeast to Port Perry; also from St. Catherines northwest through Hamilton and Guelph to Owen Sound. The grading work will involve handling an average of 15,000 cubic yards to the mile. The maximum grades will be 2.5 per cent, and the maximum curvature 6 deg. The plans also call for building an interurban terminal at Toronto. F. A. Gaby, chief engineer, Continental Life Building, Toronto, Ont.

Connecticut

Major G. B. Pillsbury, corps engineer, U. S. A., New London, will receive bids until December 29th, for dredging in Thames River. He will also receive bids until December 16th, for dredging, New Haven, Harbor.

Cuba

The Ferrocarril del Norte Occidental has been organized with capital stock of $60,000 to build a railroad along the north coast from Havana to Montua. Enrique Gomez Pastor, Havana, is president and Juan A. Forile is secretary.

Kansas

It is planned by Atchison, Topeka & Santa Fe Railway, Hutchinson, Kan., to double track line between Hutchinson & Mission, distance 30 miles.

Kentucky

The Kentucky Southwestern Electric Railway, Light & Power Company which was incorporated in 1911, will let contracts and start construction work soon, on the line projected from Paducah, Ky., south through Lone Oak, Melber and Fancy Farm to Mayfield, thence east via Sedalia and Lynn Grove to Murray, 57.75 miles. The work will be easy and calls for cuts and fills involving the handling of about 1,000,000 cubic yards. The maximum grade will be 2 per cent, and the maximum curvature 8 deg. There will be one 1,800-foot trestle and a number of smaller ones. The plans include a power house, three substations, car barns and repair shop. H. C. Rhodes, president; Paducah.

Minnesota

Duluth & Iron Range R. R., W. A. Clark, chief engineer, Duluth, Minn., will start grading this fall on spur to Consolidated-Vermillion mines.

Mississippi

J. R. Slattery, Maj. Corps of Engineers, U. S. Army, will receive bids until 11 a. m., November 24, for constructing about 1,249,000 cubic yards levee enlargement in the Third District, Mississippi River.

Montana

It is being planned by the Great Northern Railway Company to extend its line from Gilman to Augusta, Mont., a distance of several miles and to start work within 30 days.

Bids will be received until December 15, by U. S. Reclamation Service, St. Ignatius, Mont., for construction of about 38 miles of canals and laterals involving the excavation of about 105,000 cubic yards of material. The work is situated on east side of Flathead river, about 18 miles southwest of Polson, Mont., and 9 miles west of Ronan, Mont.

It is contemplated by the Oregon Short Line Railroad Company, Amstead, Mont., to purchase the Gilmore & Pittsburg Railway, which is 120 miles long, and extend from present terminus at Salmon, Ida., along Snake River to Grangeville.

North Carolina

The Elkin & Allegheny Ry., according to reports, is to resume at once construction work on its 35 miles of new line. C. B. Penney, Elkin, N. C., is general manager.

Tennessee

E. M. Markham, Maj. Corps of Engineeers, U. S. Army, Memphis, will receive bids until 11 a. m., November 25, for constructing about 800,000 cubic yards levee work in the Upper and Lower St. Francis and White River Levee Districts.

Construction plans have been announced by the Tennessee & Kentucky Interurban R. R., which proposes to build a line from Nashville, Tenn., to Adairville, Ky., about 45 miles, via Goodlettsville, White House, Cross Plains, Orlinda and Lamont. It is estimated that the cost of construction will be $786,258. Headquarters of the company are at Nashville, and officers are J. P. Helms, president; A. G. Merritt, Jr., vice-president; Paul D. Denton, secretary; H. L. Sperry, treasurer, and Clyde Shropshire, attorney.

Texas

Surveys have been completed by Quanah, Acme & Pacific Railroad Company, Robt. Gray, Quanah, Tex., general manager, for constructing line from Roaring Springs, Tex., to Roswell, N. Mex., distance about 200 miles.

It is being planned by Uvalde & Northern Railroad Company F. H. Dillon, Sansom, Tex., chief engineer, to resume construction on 50-mile line from Uvalde to Leahy.

It is being planned by Galveston, Harrisburg & San Antonio Railroad, I. A. Cottingham, Houston, Tex., assistant general manager, to reconstruct lines from San Antonio to El Paso, distance about 600 miles.

Preliminary arrangements are being made by Gulf, Freeport & Northern Railway Company, C. L. Sharp, Freeport, Tex., general manager, to extend its railway from Freeport to Rosenburg, Tex.

Beaumont, Liberty & Houston Traction Co., Edward Kennedy, Houston, Texas., president, will start surveys this month for construction of electric railway between Houston and Beaumont, also for line between Houston and Waco.

Construction of a branch line between San Antonio and Del Rio, Texas, about 200 miles long, will be commenced soon by Kansas City, Mexico & Orient Railroad; R. P. Parker, San Angelo, Texas, chief engineer.

Utah

Contracts are about to be let by Union Pacific Railroad Co., Ogden, Utah, for constructing 8 miles double track between Ogden and Utah.

Virginia

It is contemplated by Charlottesville Interurban Railway Co., Walter Washabaugh, Charlottesville, chief engineer, to construct 15-mile railway from Charlottesville to Alberne.

Washington

A contract for constructing 4,800 feet canal, 15x75 feet, between Oak Bay and Port Townsend, Washington, was awarded to Pugent Sound Bridge & Dredging Co., Central building, at $51,485. Will include 2,000 feet bulkhead and 600 feet brush, stone and creosoted pile jetties, 770 feet creosoted piles, 26,000 feet untreated piles, 600 cords brush facines, 3,000 tons loose brush, 8,000 tons stone, 20,000 feet lumber and 225,000 cubic yards dredging.

The Cherry River Southern Ry. will probably let contracts in February, to build a 35-mile line from Curtin, W. Va., which is on the Baltimore & Ohio. The project route from Curtin is along the south side of Gauley river to the mouth of Hominy creek, 20 miles, thence up Hominy creek eight miles, thence along Angling creek five miles to Meadow river and along that stream two miles to Bays Ferry near the point at which the counties of Nicholas, Greenbrier and Fayette meet. About 25 miles has been permanently located, and this work is expected to be finished on the other 10 miles by December 1. About 25 miles of the work will be difficult and heavy, and the other ten miles will be comparatively light construction. The estimated cost of building the line will be $15,000 a mile. The maximum grade will be 1 per cent, and the maximum curvature 16 deg. There will be eight trestles ranging in length from 100 to 450 ft. each. The principal commodities to be carried will be lumber and timber. H. L. Kirtley, president; E. H. Venable, chief engineer, Charleston, W. Va.

Wisconsin

It is being planned by the Superior & Southeastern Railway Co., J. E. Glover, New Richmond, Wis., president, to extend line from New Richmond, Wis., into Bayfield county.

It is intended by the Chicago & Northwestern Railway Co. to build a 16-mile single-track extension from Oconto county into Langdale county and 8 miles branch in Langdale Co.

The Janesville & Madison Traction Co., C. A. Van Ness, Madison, secretary, has completed surveys for a 43-mile line between Janesville and Madison, Wis., via Edgarton and Albion.

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The wedge or key is driven ABOVE rail, NOT below base as on other clamps.

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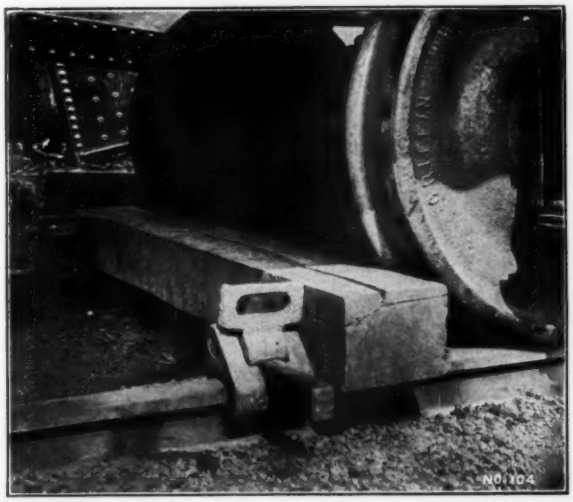

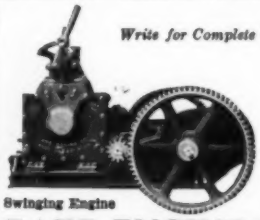

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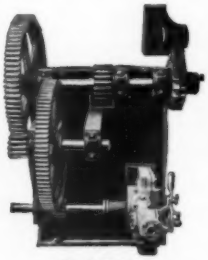

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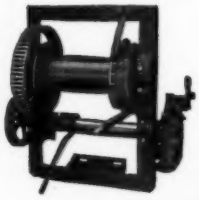
For raising and lowering spuds on dredges



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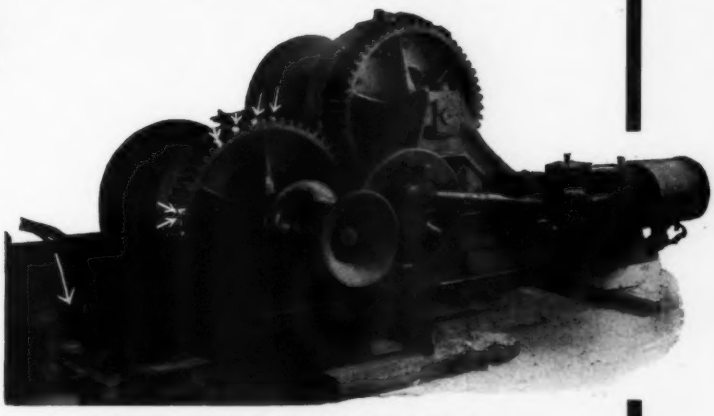

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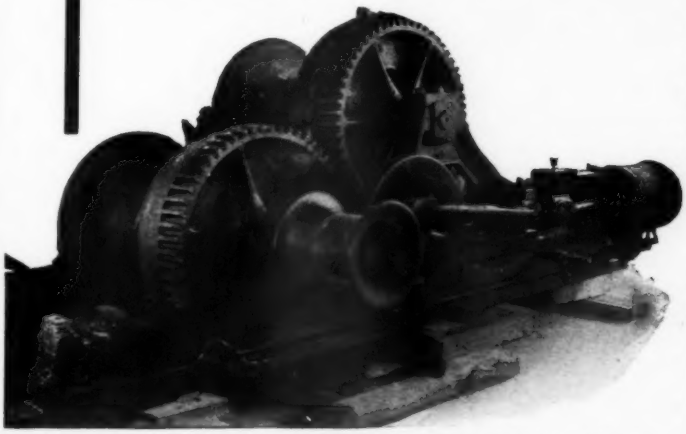

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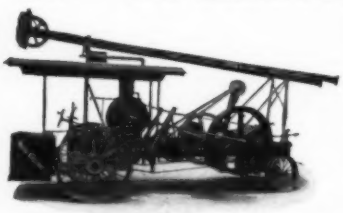

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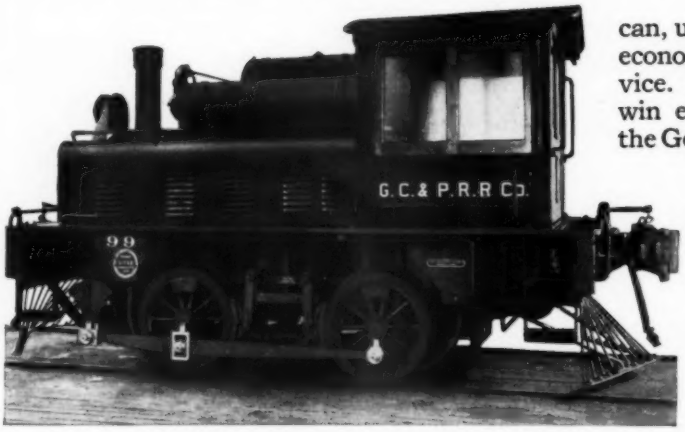

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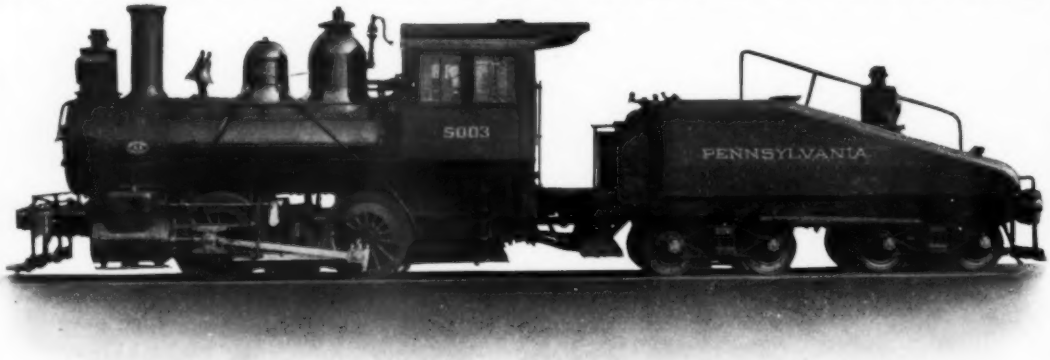

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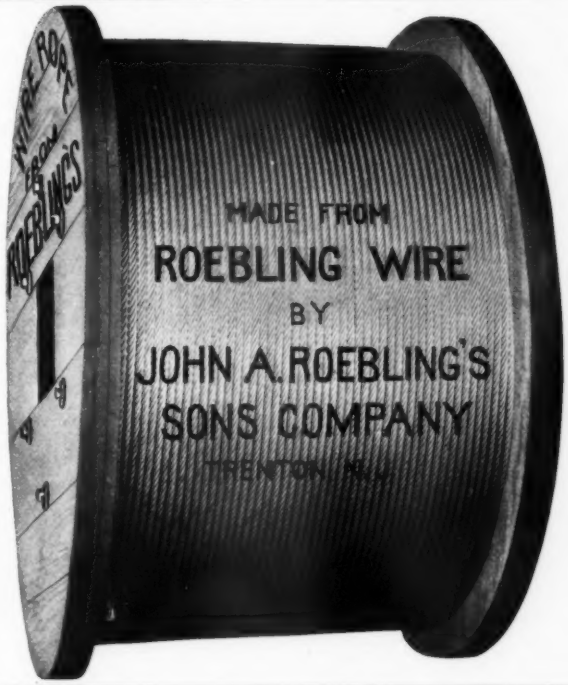

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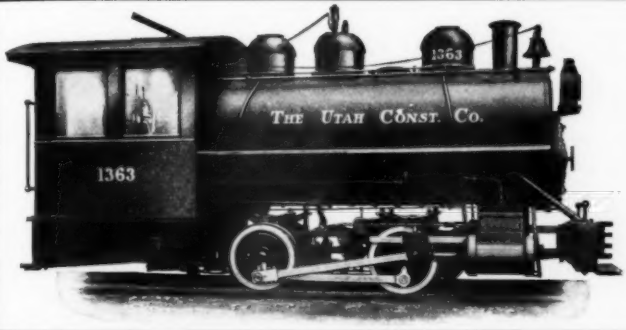

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